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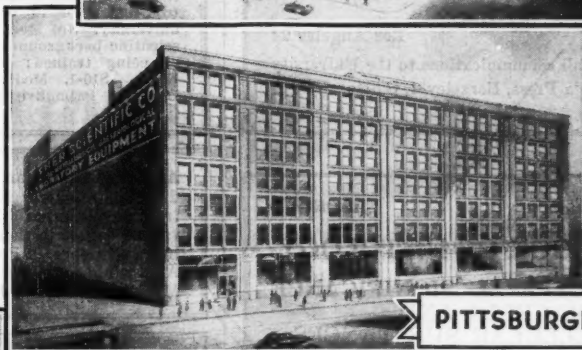
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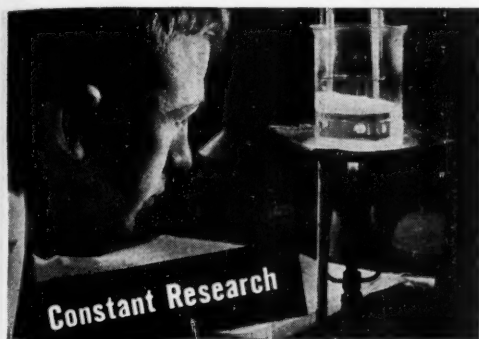
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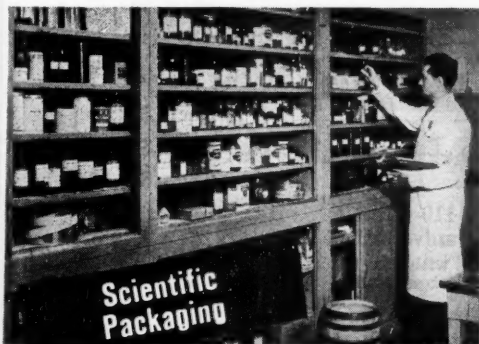
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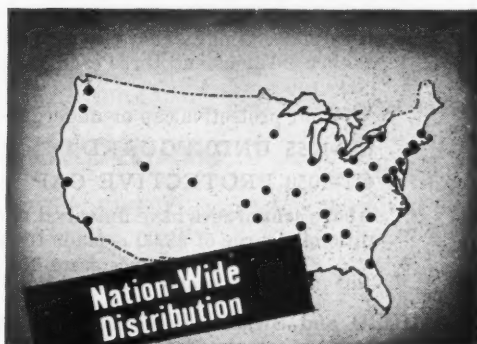
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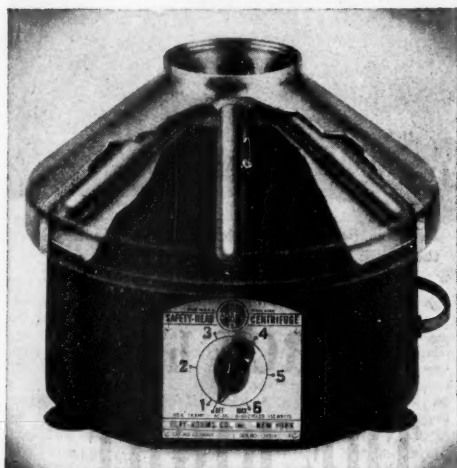
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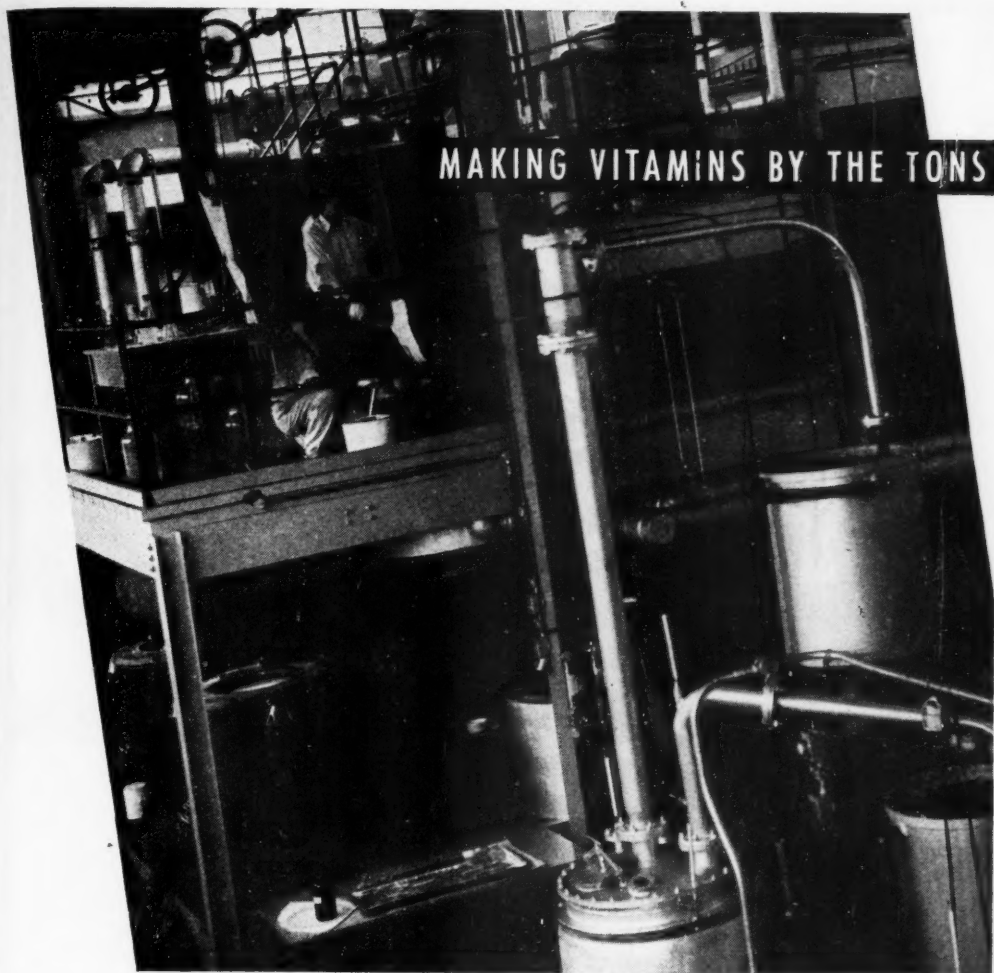
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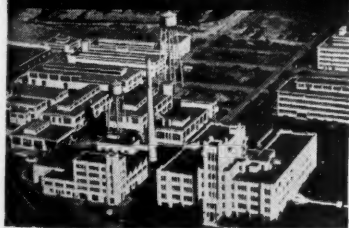




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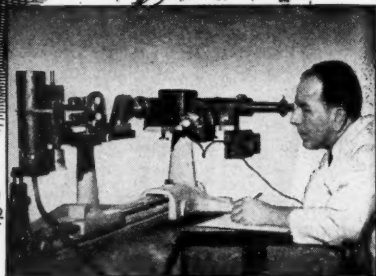
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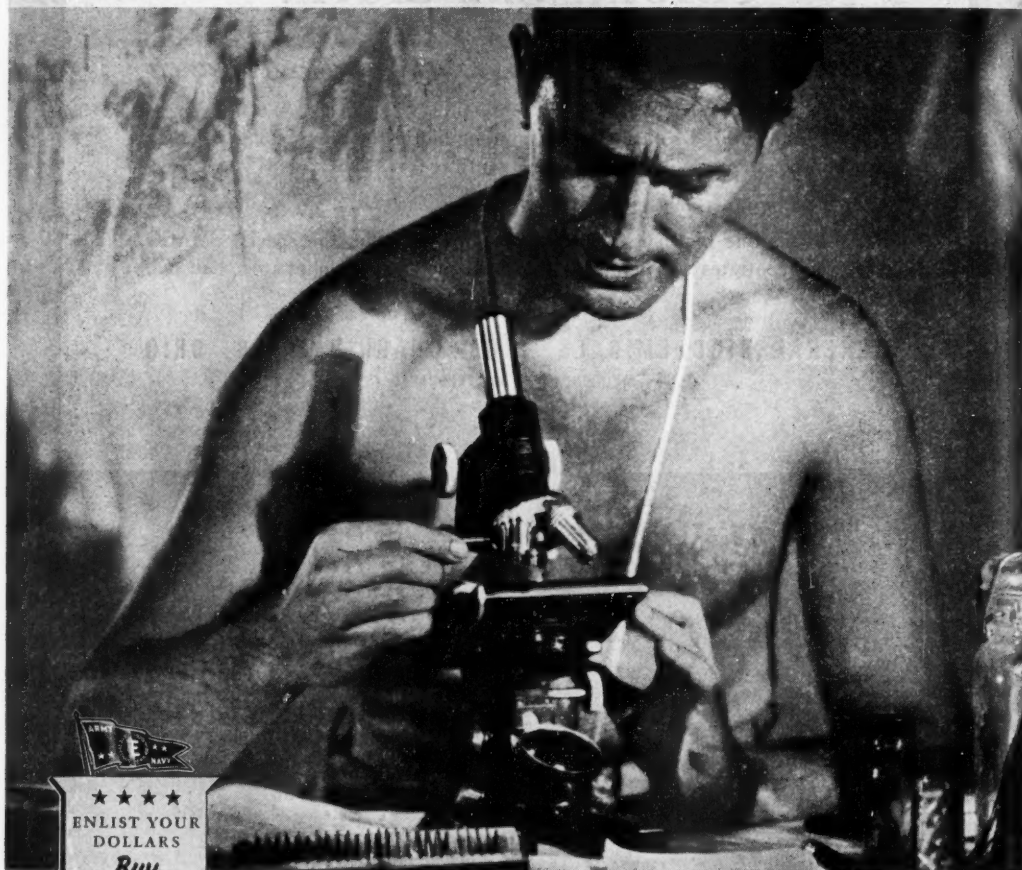
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# SCIENCE

Vol. 100

FRIDAY, OCTOBER 27, 1944

No. 2600

<i>The Fifth Cleveland Meeting of the American Association for the Advancement of Science and Associated Societies: Edited by DR. F. R. MOULTON</i> .....	365	TRÁN. <i>The Generic Name of the Sand Fly: FRANCIS HEMMING</i> .....	383
<i>Some General Impressions</i> .....	365	<i>Scientific Books:</i>	
<i>Registration</i> .....	366	<i>Spectroscopy: DR. WILLIAM F. MEGGERS</i> .....	385
<i>General Sessions</i> .....	366	<i>Special Articles:</i>	
<i>The Presidential Address</i> .....	366	<i>Experimental and Clinical Observations on Increased Mechanical Fragility of Erythrocytes: DR. SHU CHU SHEN, DR. W. B. CASTLE and ELEANOR M. FLEMING. Progressive Ascending Paralysis in Dogs Due to Deficiency of a Vitamin B Complex Factor Found in Yeast: SUSAN GOWER SMITH. The Inactivation of Antibiotics: DR. C. J. CAVALITO and DR. JOHN HAYS BAILEY</i> .....	387
<i>Annual Association-Sigma Xi Address</i> .....	367	<i>Scientific Apparatus and Laboratory Methods:</i>	
<i>Annual Association-Phi Beta Kappa Address</i> .....	367	<i>Enhanced Production of Penicillin in Fluid Medium Containing Cellophane: DR. GREGORY SHWARTZMAN</i> .....	390
<i>National Geographic Society-Smithsonian Institution Lecture</i> .....	367	<i>Science News</i> .....	10
<i>General Symposia</i> .....	368		
<i>Section and Society Programs</i> .....	369		
<i>Expenses of the Cleveland Meeting</i> .....	377		
<i>Minutes of the Council Meeting</i> .....	377		
<i>The Academy Conference</i> .....	378		
<i>Obituary:</i>			
<i>Recent Deaths</i> .....	379		
<i>Scientific Events:</i>			
<i>The United Nations Standards Coordinating Committee; The National Industrial Chemical Conference and the Chemical Exposition; Memorial Meeting in Honor of Marie Skłodowska Curie</i> .....	379		
<i>Scientific Notes and News</i> .....	380		
<i>Discussion:</i>			
<i>Fundamental Biological Research in Wartime: LIEUTENANT WILLIAM TRAGER. Comments on Comparative Studies in Human Biology: PROFESSOR M. F. ASHLEY MONTAGU. The Correct Names of Parasites in Human Malaria: DR. ENRIQUE BEL-</i>			

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## THE FIFTH CLEVELAND MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AND ASSOCIATED SOCIETIES

Edited by Dr. F. R. MOULTON

PERMANENT SECRETARY

FROM September 11 to 16, 1944, the one hundred and eleventh meeting of the American Association for the Advancement of Science was held in Cleveland, Ohio. Four meetings of the association had previously been held in Cleveland, the first in 1853 and later ones in 1888, 1913 and 1931. A meeting scheduled for Cleveland in 1852 was canceled because of an epidemic of yellow fever that prevailed from the Ohio River southward. This was the only time in 96 years that a meeting of the association was interfered with by disease, but during that interval there were seven years in which the association held no meetings because of war. Five of those years were 1861 to 1865, inclusive, when those who together had won their political freedom became for a time bitter enemies; and the remaining two were the

years 1942 and 1943, when nearly all the world was at war.

Only 43 papers were presented at the Cleveland meeting in 1853, and 215 in 1888. In 1913 the number had increased to 813, and in 1931 to 1,830. At the recent meeting the number of addresses and papers had declined to fewer than 1,000 because of the many distractions due to the war. The membership of the association in 1853, 1888, 1913 and 1931 was 940, 1,764, 8,333 and 19,059, respectively. This year at a corresponding date was 25,000, in round numbers.

### SOME GENERAL IMPRESSIONS

First on the list of general impressions of the Cleveland meeting is that it was much better than any one

expected. The attendance was surprisingly large, the difficulties of travel were not really serious, the accommodations for meetings and for individuals were adequate, and many of the programs were of a very high order of excellence. A large number of scientists expressed their hearty approval of the meeting, and not one was heard to say he regretted attending it. The long-deferred pleasures of conferences among scientists and the favorable developments on the war fronts in Europe formed a striking contrast to the dark days of the Seattle meeting in June, 1940, when France was falling to the Germans and the British were being driven into the sea at Dunkerque. It seemed like returning spring after a long, hard winter.

There were, nevertheless, a few difficulties, particularly on the part of the association which carries the full responsibility for making all physical provisions for the meeting. The exceptionally heavy burdens on the local scientific and educational institutions and the lack of manpower made it impossible for members in Cleveland to lend in full measure the generous assistance usually given. Yet the wheels of all the machinery of a great meeting of 43 sections and independent scientific societies had to be kept turning. As illustrations of difficulties, in their home institutions it is a simple matter for scientists to exhibit a few slides; at Cleveland it was necessary for the association to employ professional operators whose charges were the same for a session whether five or 500 slides were shown. It was necessary to get out in a period of about two weeks a General Program of 145 pages containing titles of addresses or papers by 816 different persons. To the difficulties due to shortages of paper and of skilled workers in printing plants were added those arising from a large number of changes in programs, even after they were in page form. Although these changes cost \$300 they were taken care of down to the last possible minute.

As trying as some of the foregoing problems were while they were being solved, they promptly evaporated in the warm glow of good fellowship and hopefulness for the future that pervaded the meeting. Every one appeared to be looking forward to better programs and better meetings, organized for the broad purpose of not only advancing science but of serving society.

### REGISTRATION

Since several meeting places were at considerable distances from registration headquarters, it was inconvenient for many persons to register. Consequently many did not register and their local addresses could not be given in response to inquiries. Moreover, they did not have the General Program which contained not only the details of every special program but also a summary of all events by days

and an alphabetical list of the names of all those who were on any program.

The following is a summary by states and foreign countries of the 1,035 persons who did register: Alabama, 4; Arkansas, 4; California, 20; Colorado, 4; Connecticut, 26; District of Columbia, 26; Florida, 7; Illinois, 74; Indiana, 43; Iowa, 18; Kansas, 8; Kentucky, 10; Louisiana, 7; Maryland, 20; Massachusetts, 43; Michigan, 52; Minnesota, 19; Mississippi, 1; Missouri, 12; Montana, 2; Nebraska, 5; New Hampshire, 3; New Jersey, 15; New Mexico, 1; New York, 108; North Carolina, 11; Ohio, 332 (Cleveland, 210; other cities, 122); Oklahoma, 5; Oregon, 2; Pennsylvania, 63; Rhode Island, 3; South Carolina, 3; South Dakota, 1; Tennessee, 5; Texas, 10; Utah, 1; Vermont, 2; Virginia, 26; Washington, 3; West Virginia, 5; Wisconsin, 14; Wyoming, 1; no state given, 1; Canada, 12; China, 1; Peru, 1; Venezuela, 1.

### GENERAL SESSIONS

At each of its annual meetings the association schedules a number of general sessions at which distinguished scholars deliver nontechnical addresses. These broad surveys are as essential for the progress of science and civilization as are the technical reports on current investigations. For specialists, they broaden perspectives; for the intelligent public, they open new horizons. For these reasons the general sessions are open to both scientists and other interested persons.

### THE PRESIDENTIAL ADDRESS

By long-established custom the retiring president delivers his presidential address on the evening of the first day of the annual meeting in the year following his term of office. Accordingly, Dr. Isaiah Bowman, president of the association in 1943, and president of The Johns Hopkins University, was scheduled to deliver his retiring address on "Commanding Our Wealth" in the Music Hall of the Cleveland Auditorium, on Monday evening, September 11. Dr. Bowman was not able to deliver his address in person because of imperative demands that he remain in Washington for reasons explained briefly in the following statement:

I am deeply conscious of the honor and the responsibility which the presidency of the American Association for the Advancement of Science implies. It had been my intention to attend the Cleveland meeting of the Association this year and deliver in person the address which I prepared for the occasion. To my great disappointment I am not able to come. As a member of the American Delegation to the Dumbarton Oaks Conference I am engaged upon public business of great urgency. Our time is limited and each day has its special budget of

duties. I feel sure that the members of the Association will understand the situation and forgive my absence.

As a nation we are facing decisions and responsibilities more grave than any that we have had to consider in our whole past. To reach sound decisions and faithfully to discharge our responsibilities require us to make fuller use of our national associations than ever before. No group of interests can draw apart from the general interest and claim a special and detached status. We are parts of one whole. Good citizenship must be joined to good science. The more pervasive the effects of science the more pervasive must be the interest of the scientist in the society in which his scientific discoveries do their work.

My address this year attempts to effect such a marriage of interests in one limited field. I have been engaged for some time in the study of frontier societies, the areas of pioneer settlement, and the application of the results of such studies to the problems of migration, so-called over-population, and human well-being. During the past few years these studies have been given an immediately practical turn because of the refugee problem. Pioneer settlement is also intimately connected with the use of resources in general. In developing the theme I have sought to place certain type problems in their political and social setting.

The address which I have prepared on this theme is entitled "Commanding Our Wealth" and will be published in full in *SCIENCE*, issue of September 15. On this occasion the Permanent Secretary of the Association, Dr. Moulton, has been good enough to accept my invitation to read suitable portions of it, and I wish to thank him warmly for accepting the invitation.

Through Dr. Carlson, your president this year, I wish to express my interest in the Cleveland meeting, my hope for its success, and my deep regret that circumstances compel me to be absent. I had hoped to greet the members and especially to thank them for the high honor which they bestowed upon me. I look forward to the time when I shall be able again to enjoy the fellowship of a meeting of the Association under the happy conditions of peace toward which we now strive so hopefully.

#### ANNUAL ASSOCIATION—SIGMA XI ADDRESS

(From report by George A. Baitzell, secretary)

On Tuesday evening, September 12, Dr. Edwin J. Cohn, Harvard University, delivered the twenty-first annual lecture under the joint auspices of the association and the Society of the Sigma Xi. His subject was "Blood and Blood Derivatives," a subject of very great importance in caring for the severely wounded. The subject was ideal for presentation before an intelligent audience—it pertained to the life fluid of human beings, it was rapidly developed under the urgent needs of war and its applications will save human lives through all the future. It was presented by the master who largely created it and who, fortunately, is equally a master of clear and dignified exposition of scientific work. Attendance, about 500.

#### ANNUAL ASSOCIATION—PHI BETA KAPPA ADDRESS

On Wednesday evening Dr. Harlow Shapley delivered the eighth annual lecture under the joint auspices of the association and the United Chapters of Phi Beta Kappa. His subject, "A Design for Fighting," excited the curiosity of those who know him as an unsurpassed lecturer on the marvels of the galaxies of stars that lie in the infinity of space beyond the borders of our own Milky Way system. What he discussed in his usual brilliant and original way was worthy objectives for which scientists and all good men and women might strive.

#### NATIONAL GEOGRAPHIC SOCIETY—SMITHSONIAN INSTITUTION LECTURE

The fourth general session, held on Thursday evening, consisted of an illustrated lecture by Dr. Matthew W. Stirling, chief of the Bureau of American Ethnology, and Mrs. Stirling. The title of the lecture was "The National Geographic Society—Smithsonian Institution Archeological Expeditions to Southern Mexico," of which Dr. Stirling was the leader. This delightful lecture by Dr. and Mrs. Stirling was abundantly illustrated by slides and motion pictures, many of them in color, which they had taken in their six expeditions. In the midst of tropical jungles they discovered and brought to light remains of civilizations long decayed and forgotten. Among many evidences of highly developed cultures of these early Americans they discovered innumerable fine specimens of beautifully carved, polished jade. A stone inscribed with Mayan numerical symbols carried the earliest recorded date of the Western Hemisphere—November 4, 291 B.C., according to the Spinden Correlation.

These four general sessions provided broad views of various aspects of science in its relations to civilization. In his presidential address, Dr. Bowman discussed a political problem of present great importance by the clear, objective methods of science. Dr. Cohn described and interpreted new frontiers of medical research in terms that made clear their high promise in saving human lives. Dr. Shapley, with the imagination of an astronomer and the zeal of a crusader, exposed certain human follies which he urged should be abandoned for equally specific human wisdom. Dr. and Mrs. Stirling rolled back the curtain that had hitherto concealed some of the earlier attempts of men to achieve happiness in this Western World. In view of the preoccupation of scientists with war work and the many distractions at Cleveland, the attendance at these general sessions, particularly the last, was gratifying. They were of the type of sessions that have made the meetings of the British

Association for the Advancement of Science memorable events.

### GENERAL SYMPOSIA

At conferences of secretaries of sections of the association and of associated societies, held in Chicago and New York last February, it was recommended that adequate time at the Cleveland meeting be devoted to general sessions on the larger problems of science, such as science and the post-war world, with particular emphasis upon rehabilitation, education, and research. In conformity with that recommendation, the following general symposia were organized and presented:

#### COMMITTEE ON SCIENCE AND SOCIETY

(From report by Lawrence K. Frank, chairman)

The Committee on Science and Society, a committee of the council of the association, organized a symposium on "Research after the War: the Need for a National Policy on Research," under the leadership of L. K. Frank, chairman of the committee. Among the participants in the discussions were Charles Adams, Stanley D. Dodge, John E. Flynn, Otto Glasser, E. P. Hutchinson, Margaret Mead, Paul Sears, Henry S. Simms and Paul Weiss. The symposium proposed that the council of the association appoint a committee to cooperate with committees of other major scientific organizations to consider the feasibility of establishing a Natural Science Planning Board. Attendance, about 50. (See minutes of meetings of the council; see also report of conference on "Publication Problems in Biology.")

#### SYMPOSIUM ON "THE ROLE OF SCIENCE IN UNITED NATIONS COLLABORATION FOR THE IMPROVEMENT OF NUTRITION AND AGRICULTURE AFTER THE WAR"

(From report by Howard R. Tolley, chairman)

This symposium was organized under the chairmanship of Dr. Howard R. Tolley, chief, Bureau of Agricultural Economics, U. S. Department of Agriculture. The contributors were: Dr. Frank G. Boudreau, director, Milbank Memorial Fund, who presented a paper on "The Problems We Face in Nutrition"; Professor Robert Rae, professor of agriculture, University of Reading, England, who presented "The Problems We Face in Food Production"; and P. Lamartine Yates, British Ministry of Agriculture, who presented "The Problems We Face in Economics." Attendance, about 75.

#### SYMPOSIUM ON BIOLOGISTS AND REHABILITATION

Symposium on "Biologists and Rehabilitation" was held under the chairmanship of Dr. G. M. Smith,

Stanford University. The participants were: Dr. E. G. Butler, Princeton University, "Some General Remarks"; Dr. Frans Verdoorn, *Chronica Botanica* and Arnold Arboretum, "The Plant Scientist in the World's Turmoil"; Dr. Robert F. Griggs, George Washington University, "Biology and Agriculture After the War"; and Dr. W. E. Loehwing, University of Iowa, "Rehabilitation and the College Curriculum."

#### SYMPOSIUM ON "THE JOINT RESPONSIBILITIES OF SCIENCE AND THE AMERICAN PRESS IN THE POST-WAR WORLD"

(From report by David Dietz, chairman)

On Friday morning, September 15, the National Association of Science Writers held a symposium commemorating the tenth anniversary of the founding of the organization, under the chairmanship of David Dietz, *The Cleveland Press*. The contributors and papers to this symposium were Robert D. Potter, science editor of *The American Weekly*, "A Brief History of the National Association of Science Writers"; Dr. A. J. Carlson, president of the association, "Science Faces the Future"; Louis B. Seltzer, editor of *The Cleveland Press*, "Science and the Daily Newspaper"; Lionel C. Moise, assistant editor of *The American Weekly*, "Science and the Newspaper Feature Magazine"; G. Edward Pendray, The Westinghouse Electric and Manufacturing Company, "Industry, Science and the Public"; and Dr. Morris Fishbein, editor of the *Journal of the American Medical Association*, "Medical Progress, the Public, and the Press." Although this symposium was held after most of the sections and societies had completed their programs, it attracted a great deal of interest, clear evidence of the importance scientists have come to attach to the competent reporting of scientific meetings in the press. Attendance, about 200.

#### CONFERENCE ON PUBLICATIONS IN BIOLOGY

(From report by John E. Flynn, chairman)

The participants in this conference were John E. Flynn, editor-in-chief of *Biological Abstracts*; Robert F. Griggs, chairman, Division of Biology and Agriculture, National Research Council; Miss Zeliaette Troy, librarian, Boyce Thompson Institute for Plant Research; R. E. Buchanan, dean of the Graduate College, Iowa State College; Herman H. Henkle, director, Processing Department, Library of Congress; Fernandus Payne, dean of the Graduate School, Indiana University; and Paul Weiss, The University of Chicago. At the conclusion of the conference the following resolution was passed:



WHEREAS, the field of biological publication is in a critical state of confusion;

WHEREAS, the condition of the publication system is merely a symptom and reflection of the state of research; and

WHEREAS, the growing importance of science in our civilization counsels that fundamental and applied research be conducted in such a manner that it will best serve the advancement of science, and through science, society:

Therefore, *Be It Resolved* that the present conference go on record as favoring a broad study of the aims, ways and means of scientific research, with the view of articulating the unwritten code of scientific research policy and strategy, including education, publication and financing; and

*Be it further resolved* that, in order to implement this recommendation, the major bodies representing the interests of scientific research in the U.S.A., National Academy of Sciences National Research Council, American Association for the Advancement of Science, and the Society of the Sigma Xi, be asked to consider the setting up of standing Committees on Research Policy and Research Strategy, possibly with the sub-committees on education for research, publication of research, and financing of research, to investigate and advise on the problems involved.

## SECTION AND SOCIETY PROGRAMS

### SECTION ON MATHEMATICS (A)

(From report by M. G. Boyce, secretary pro tem.)

At the one session of the section, held on Tuesday afternoon, F. D. Murnaghan, The Johns Hopkins University, delivered his address as retiring vice-president of the section on "The Teaching of Mathematics." At the same session Richard S. Burington, Case School of Applied Science, on leave in the Bureau of Ordnance, U. S. Navy, presented a paper on "New Frontiers." The audience consisted largely of mathematicians from northern Ohio. Attendance, 35.

### SECTION ON PHYSICS (B) AND THE OHIO SECTION OF THE AMERICAN PHYSICAL SOCIETY

(From report by Leon E. Smith, secretary pro tem.)

The section and its affiliated society held a session on Monday morning for the presentation of general papers. The afternoon program consisted of two invited papers, one by Otto Glasser, The Cleveland Clinic, on "Medical Physics"; the other by Detlev W. Bronk, The Eldridge Johnson Foundation, on "Biophysics in Modern War and Technology." The Tuesday morning session was held in two sections, one for the presentation of 5 papers on metallurgical problems and the other a joint session with the Section on Geology and Geography and the Ohio Academy of Science, Geology Section, in their symposium on the "Geology and Mineralogy of Quartz," at which

6 papers were presented. At the Tuesday afternoon session of the symposium on quartz 6 papers were presented. The attendance at the Monday morning session was 53; at the afternoon session, 65; at the Tuesday morning session on metals, 60; and at the joint session Tuesday afternoon on quartz, 85.

### SECTION ON CHEMISTRY (C)

(From report by Neil E. Gordon, secretary)

On Thursday afternoon the Section on Chemistry held a symposium on "Catalysis" under the chairmanship of Arthur J. Hill, vice-president for the section, at which three papers were presented. The first paper was on "Catalysis in the Deterioration of Lubricating Oils," by R. E. Burk, E. C. Hughes, W. E. Seovill and J. D. Bartleson. The second was on "Catalysis in Reactions of Polymerization and Depolymerization" by A. V. Tobolsky. The third paper, presented by the retiring vice-president for the section, Hugh S. Taylor, was on "Ten Years of Research and Development in Catalysis." Members of the section and friends joined in a dinner on Thursday evening in honor of Dr. Taylor. Attendance, about 40.

### SECTION ON ASTRONOMY (D)

(From report by C. C. Wylie, secretary)

The section held a session for the presentation of four general papers on Thursday morning and a symposium in the afternoon on "Objective Prism Spectra" and a report on a survey of faint red stars made at the Dearborn Observatory of Northwestern University. The subject of the symposium was chosen because of superior new equipment of the Warner and Swasey Observatory of the Case School of Applied Science. J. J. Nassau, director of the observatory, and Carl K. Seyfert, astronomer, made the principal reports. Formal discussions by a number of astronomers from other observatories followed. Oliver J. Lee reported on the survey of red stars at the Dearborn Observatory. Attendance, about 40.

### SECTION ON GEOLOGY AND GEOGRAPHY (E) AND ASSOCIATED SOCIETIES

(From reports by Howard A. Meyerhoff and George W. White)

On Tuesday, both morning and afternoon, the section held a symposium on "Quartz," a mineral which has suddenly become tremendously important because it is indispensable in radio sets for war use. The fact that 99 per cent. of all quartz crystals suitable for radio use comes from Brazil raises many practical problems. The Tuesday morning program consisted of 6 papers on the geology and mineralogy of quartz. In the afternoon 6 papers were presented on the

physics of quartz in a joint session with the Section on Physics, the Ohio Section of the American Physical Society, and the Ohio Academy of Science Section on Geology.

On Wednesday and Thursday the section held four joint sessions with the Ohio Academy of Science Section on Geology. At the morning session on Wednesday 7 papers were presented on "Geography and Economic Geology." The general subject for the Wednesday afternoon session was "Stratigraphic and General Geology" on which 10 papers were presented. The two sessions on Thursday were held under the same auspices. At the morning session 9 papers were presented on "Quaternary Geology of the Great Lakes Region"; in the afternoon 12 papers on "Physiographic Geology and Meteorology" were presented. In the three days, Tuesday to Thursday, 6 sessions were held before which 50 papers were presented, and on Friday the section and the Ohio Academy of Science Section on Geology joined in field excursions under the leadership of M. D. Harbaugh, David H. Dunkle and Henry F. Donner.

Among the papers presented at the sessions of the section there were three vice-presidential addresses, two of which were deferred from 1942 and 1943, when meetings of the association were not held. The address of Dr. M. M. Leighton, retiring vice-president for the section in 1942, was on "Present Knowledge and Problems Concerning the Glacial History of Illinois." Professor Chester R. Longwell, retiring vice-president in 1943, chose for the subject of his address "Education in Geology—How Advance It?" The subject of Dr. John K. Wright's vice-presidential address was "Human Nature in Science." The program was excellent, the facilities were very satisfactory, and the estimated number of different persons attending the sessions for the presentation of papers and the field trip was 225.

#### SECTION ON ZOOLOGICAL SCIENCES (F) AND AMERICAN SOCIETY OF ZOOLOGISTS

(From reports by J. W. Buchanan and L. V. Domm)

The section itself held no formal session except its business meeting, which was attended by approximately 150 persons, the largest attendance in the past 25 years. The address of the retiring vice-president for the section, Dr. George T. Hargitt, Duke University, was delivered at the Zoologists Dinner on Wednesday evening. The title of Dr. Hargitt's address was "What is Germ Plasm?"

The American Society of Zoologists participated in three important symposia besides holding 7 sessions at which 58 papers and 12 demonstrations were presented. The first, a joint session with the Section on Medical Sciences, on "Parasitology in Relation to

the War," was presented under the chairmanship of Benjamin Schwartz. The American Society of Parasitologists was scheduled to participate in this symposium, but canceled its entire meeting too late to have its announcement removed from the General Program. Brigadier General James S. Simmons, Medical Corps, U. S. Army, opened this symposium with a paper on "The Wartime Importance of Tropical Diseases." Major O. R. McCoy, Medical Corps, U. S. Army, discussed "Malaria and the War." Clay G. Huff and Frederick Coulston, The University of Chicago, presented a paper on "The Development of Malarial Sporozoites in the Vertebrate Host." Harold W. Brown, Columbia University, discussed "Filariasis," and R. E. Dyer, the National Institute of Health, had a paper on "Typhus Fever." The subject of the contribution of W. E. Dove, the U. S. Bureau of Entomology and Plant Quarantine, was "Development of Louse Powders for the Armed Forces," while Benjamin Schwartz spoke on "Parasites in Relation to Production of Meat and other Animal Products in Wartime."

The second symposium, on "Genes as Physiological Agents," was held under the chairmanship of Dr. Sewall Wright, president of the society. The program consisted of 4 papers: "General Considerations," by Sewall Wright; "Genic Control of Biochemical Reactions in Neurospora," by N. H. Horowitz, David Bonner, H. K. Mitchell, E. L. Tatum and G. W. Beadle, but presented by N. H. Horowitz; "Dependence of the Physiological Action of Genes on Primers," by T. M. Sonneborn; and "Chromosomal Control of Embryogenesis in *Drosophila*," by D. F. Poulson.

The third was a joint symposium on "Biology and Human Progress," organized by the American Society of Naturalists and participated in by American Society of Zoologists and Botanical Society of America. The program is given below under report of "American Society of Naturalists."

On Tuesday morning 10 papers were presented in the fields of cytology and embryology. On Wednesday morning 10 papers were presented before the Section on Endocrinology and 8 before the section on Parasitology, General Evolution and Ecology. The Society met in two sections on Wednesday afternoon, at one of which 9 papers were presented before the section on Endocrinology and General Physiology, while the program of the second section consisted of 3 motion picture demonstrations and 9 general demonstrations.

On Thursday morning the society held two sessions. Before the section on General Physiology 13 papers were presented, and 8 papers were presented before the sections on Morphology and Protozoology.

In addition to papers presented at the meeting by their authors, 57 were presented by title as follows: in the field of cellular physiology, 5; ecology, 4; embryology, 9; endocrinology, 14; general evolution, 2; general physiology, 11; morphology, 4; parasitology, 4; and protozoology, 4.

In summary, the vice-president for the section delivered an address at the annual dinner of zoologists, 14 papers were read at the three symposia, and 70 at other sessions, a total of 85 papers presented in person by their authors. In addition 57 were presented by title.

"... all sessions of the Zoological Group were extremely well attended... the meetings as a whole were very well received and were exceedingly valuable. I arrived at this opinion not only from my own experience but from many conversations with others." "Every one seemed enthusiastic, and many were gratified that the meeting was held."

SECTION ON BOTANICAL SCIENCES (G), BOTANICAL SOCIETY OF AMERICA, AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS, MYCOLOGICAL SOCIETY OF AMERICA, AND SULLIVANT MOSS SOCIETY

(From reports by G. W. Martin, Paul R. Burkholder, Earl S. Johnston and G. B. Cummins)

Section on Botanical Sciences on Tuesday afternoon, September 12, held a joint session with Botanical Society of America, American Phytopathological Society, American Society of Plant Physiologists, Mycological Society of America and Sullivant Moss Society, at which three past vice-presidents for the section delivered addresses as follows: Dr. G. M. Smith, Stanford University, retiring vice-president in 1942, "The Marine Algae of the Monterey Peninsula, California"; Dr. W. J. Robbins, retiring vice-president in 1943, "The Importance of Plants"; and Dr. R. E. Cleland, Indiana University, retiring vice-president this year, "Phylogenetic Relationships in *Oenothera*."

Section on Botanical Sciences, Section on Agriculture, Botanical Society of America, American Society of Plant Physiologists, and American Society for Horticultural Science held a joint symposium on "Nutrition—Some Current Views," Thursday morning, September 14. Three papers were presented as follows: "Microbial Nutrition and Agriculture," by R. E. Buchanan, Iowa State College; "Plant Breeding in Relation to Human Nutrition," by R. J. Garber, U. S. Regional Pasture Research Laboratory, State College, Pa.; and "Plants in Relation to Vitamins," by A. E. Murneek, University of Missouri.

Botanical Society of America (P. R. Burkholder, reporting) also participated in the symposium, "Biology

and Rehabilitation," reported above under "General Symposia," and in the symposium, "Biology and Human Progress," reported above under the third symposium of American Society of Zoologists. The society also held two other joint sessions, one with Ecological Society of America, at which 10 papers were presented, and one with the Mycological Society of America, at which 8 papers were presented. A total of 27 papers were presented in the three symposia and the two joint sessions in which the society participated. The remainder of the society's programs were organized under its 4 sections, the General Section, the Paleobotanical Section, the Physiological Section and the Systematic Section. The General Section held three sessions at which 32 papers were presented; the Paleobotanical Section held one session at which 6 papers were presented; the Physiological Section held five sessions, all jointly with American Society of Plant Physiologists, at which 45 papers were presented. The Systematic Section held one session in which 7 papers were presented.

In addition to the sessions mentioned, the Botanical Society of America held a dinner on Wednesday evening, in which 225 members participated. At this dinner Dr. J. T. Buchholz, University of Illinois, retiring president of the society in 1942, delivered an address on "The Future of Plant Morphology." Dr. M. L. Fernald, Harvard University, retiring president of the society in 1943, delivered an address on "The Future of Systematic Botany." Dr. W. J. Robbins, New York Botanical Garden, retiring president of the society in 1944, delivered an address on "The Future of Plant Physiology." Consequently the Botanical Society of America at its 39th annual meeting either organized or participated in programs at which 120 papers were presented. Attendance, about 250.

American Society of Plant Physiologists (Earl S. Johnston, reporting) held 3 joint sessions with the Physiological Section of Botanical Society of America, at which 32 papers were presented; a joint session with the Physiological Section of Botanical Society of America and American Society for Horticultural Science, at which 7 papers were presented; participated with the Section on Agriculture, Section on Botanical Sciences, Botanical Society of America and American Society for Horticultural Science in the symposium on "Nutrition—Some Current Views," at which 3 papers were presented, and held a joint session with the Section on Botanical Sciences, Botanical Society of America, American Phytopathological Society, Mycological Society of America and Sullivant Moss Society, at which retiring addresses of 3 past vice-presidents for the Section on Botanical Sciences were delivered. On Tuesday

evening the society held a dinner at which announcements were made of the Charles Reid Barnes Life Membership Award and the Stephen Hales Award. At this dinner Dr. W. E. Loomis, Iowa State College, retiring president of the society, delivered an address on "Translocation in Maize." Attendance at the joint sessions, about 200; at the sessions for miscellaneous papers, about 50; and at the dinner, 83.

Mycological Society of America (George B. Cummins, reporting) held three sessions for the presentation of papers and conducted a tour of the Ben Venue Laboratories, Inc., Bedford, Ohio, under the leadership of Dr. G. C. Darker, to inspect the production of penicillin and blood plasma. At the first session of the society on Wednesday afternoon, September 13, Dr. G. W. Martin, president of the society for 1944, delivered an address on "The Classification of the Tremellales," followed by a session on "Medical Mycology," at which 4 papers were presented. At the two sessions on Thursday 20 papers were presented.

Sullivant Moss Society held a session on Wednesday morning at which 9 papers were presented, and a symposium in the afternoon on "Tropical American Bryophytes and Lichens," at which 3 papers were presented. On Saturday morning the society took a "foray" at Columbus, Ohio, under the leadership of R. T. Wareham.

SOCIETIES RELATED TO BOTH THE SECTION ON ZOOLOGICAL SCIENCES (F) AND THE SECTION ON BOTANICAL SCIENCES (G)

(From reports by Wm. R. Taylor, Wm. A. Dreyer and J. E. Ackert)

American Society of Naturalists (William R. Taylor, reporting) on Tuesday evening began its 60th annual meeting with the Biologists Smoker, with an attendance of about 500. On Thursday afternoon it held a symposium on "Biology and Human Progress," jointly with American Society of Zoologists and Botanical Society of America. The symposium was held under the chairmanship of Fay-Cooper Cole, president of the society. The 3 papers presented were: "Biology and the Public Mind," by Charles V. Taylor, Stanford University; "Plants and the Material Basis of Civilization," by Edmund W. Sinnott, Yale University; and "The Rehabilitation of Biological Research and Education in War-stricken Countries," by Robert Chambers, New York University. The attendance at the symposium was about 150. At the Naturalists Dinner on Thursday evening Dr. Fay-Cooper Cole, The University of Chicago, delivered his presidential address on "Some Problems on Human Racial Development and Migration."

The Ecological Society of America (William A. Dreyer, reporting) held its 29th annual meeting from Tuesday to Thursday, September 12-15, inclusive. On Wednesday morning it held a joint symposium with the section on Education on "Teaching Ecology," H. H. Remmers, chairman, the program of which consisted of 4 papers: "Methods and Content of Courses in Science," by Robert J. Havighurst, The University of Chicago; "Objectives in Biological Courses," by Neil Stevens, University of Illinois; "The Teaching of Ecology in the Biological Sciences," by Paul B. Sears, Oberlin College; and "The Teaching of Ecology as a Special Course," by J. M. Aikman, Iowa State College.

The Ecologists Dinner was held on Tuesday evening, at which Dr. Orlando Park, Northwestern University, delivered an address on "Observations Concerning the Future of Ecology." The remainder of the program of the society consisted of 5 sessions, one of which was a joint session with Botanical Society of America, a conference on "Pollen Analysis and Related Bog Problems," under the chairmanship of L. R. Wilson, Coe College, and an illustrated lecture on "The Native Forests of the Cleveland Region," by Arthur B. Williams, Cleveland Museum of Natural History. At the 6 sessions 51 papers were presented. Attendance, 75.

Officers of the society for 1945 are: *President*, Alfred C. Redfield; *vice-president*, John M. Aikman; *secretary*, William A. Dreyer; *treasurer*, Henry J. Oosting.

American Microscopical Society held its meeting on September 12. With the death of Dr. Edward Bausch the society, founded in 1878, lost one of its charter members. A large percentage of the members of the society are serving in our armed forces overseas. The treasurer reported that the value of the Spencer-Tolles Fund, the income from which is used for publishing meritorious papers, exceeds \$20,000. Officers for next year are: *President*, Raymond C. Osburn; *First Vice-president*, Charles Drechsler; *Second Vice-president*, Enrique Beltrán; *executive committee member*, L. J. Thomas; and *Spencer-Tolles committee member*, Paul S. Welch.

National Association of Biology Teachers held two sessions on Saturday, September 16, at which 7 papers were presented; a dinner on Saturday evening, at which Dr. A. J. Carlson delivered an address on "The Science of Biology and the Future of Man"; and a Sunday morning lecture and tour at Crile Museum, at which Daniel P. Quiring delivered an address on "Evolution of Energy Releasing Systems in the Animal Body."



Union of American Biological Societies held a meeting on Wednesday afternoon, September 13, to consider reports of the committee on the teaching of biology, the cooperative committee on science teaching, and the committee on closer relationships between the biologists of North and South America; the report on *Biological Abstracts*; and the society as a possible centralizing organization for American biologists.

#### SECTION ON ANTHROPOLOGY (H)

Section on Anthropology, on Friday morning, September 15, made a tour of the Hamann Museum of Anatomy and Comparative Anthropology, Western Reserve University, and a tour of Cleveland Clinic Museum; in the afternoon held a session at which 5 papers were presented: "Training Anthropologists in the Post-war Period," by Margaret Mead, American Museum of Natural History; "Results of Questionnaire on Future of Anthropology," by Ralph L. Beals, University of California; "The Problems of Race and the Peace," by A. O. Bowden, University of Southern California; "Post-war World Reconstruction and the Concept of Distribution of Mental Abilities in Races, Nations, and Social Strata," by S. Peller, New York City; and "American Contributions to Anthropology," by Dr. Robert H. Lowie, University of California, retiring vice-president of the Section on Anthropology, followed by a general discussion on "Race Problems."

#### SECTION ON PSYCHOLOGY (I), AMERICAN PSYCHOLOGICAL ASSOCIATION AND AMERICAN ASSOCIATION FOR APPLIED PSYCHOLOGY

(From reports by Edna Heidbreder and Alice I. Bryan)

Section on Psychology held a joint session with the Section on Education and the American Psychological Association on Tuesday evening, September 12, at which the retiring vice-presidents for the sections delivered their vice-presidential addresses. Dr. Harold Clark, Columbia University, vice-president for the Section on Education, delivered an address on "How Far is Experimentation in the Social Sciences Possible?" The subject of the address by Dr. Edward Tolman, University of California, vice-president for the Section on Psychology, was on "A Stimulus—Expectancy Need—Cathexis Psychology." Attendance, about 125.

American Psychological Association and American Association for Applied Psychology held four joint sessions on Monday, September 11, and two on Tuesday, the one in the evening being a joint session with the Section on Psychology. The program of the first session was a symposium on "Graduate and Profes-

sional Training of Psychologists," Edwin R. Guthrie, chairman, at which 8 subjects were scheduled for discussion. Following this the president of the American Association for Applied Psychology, Dr. Albert T. Poffenberger, Columbia University, delivered his presidential address on "Psychology: Academic and Professional," and the president of the American Psychological Association, Dr. Gardner Murphy, College of the City of New York, delivered his presidential address on "The Freeing of Intelligence." The session Monday afternoon was a conference on "The Problems and Values of the Proposed Reorganization of Psychological Societies," Robert M. Yerkes, chairman.

The program on Tuesday morning was a symposium on "Psychology and Post-War Problems," Calvin P. Stone, chairman, at which 6 papers were presented. In the evening a joint session was held with sections on Psychology and Education, the program of which was reported under Section on Psychology above. The society organized a new Military Section, of which C. M. Souttit was elected chairman and William A. Hunt, secretary. Attendance, about 200.

Psychometric Society and National Council of Women Psychologists held only business meetings.

#### SECTION ON SOCIAL AND ECONOMIC SCIENCES (K), AMERICAN STATISTICAL ASSOCIATION AND ECONOMETRIC SOCIETY

(From reports by E. P. Hutchinson and C. I. Bliss)

Section on Social and Economic Sciences (E. P. Hutchinson, secretary) presented a program on Tuesday morning, September 12, on "Geography and Population." The first paper was on "Problems in Population Geography of Maine," by Clyde F. Kohn, Harvard University; the second, "Habitability of the United States," by William J. Berry, Western Michigan College; the third, "Distribution of Aliens in the United States," by E. P. Hutchinson, U. S. Department of Justice; and the fourth, "Population Periods in the History of the United States," by Stanley D. Dodge, University of Michigan, the retiring vice-president for the section.

American Statistical Association (C. I. Bliss, reporting) on September 11–13 held 3 sessions for the presentation of papers, a round-table discussion on "The Function of the Statistical Unit in a College, University or Research Laboratory," and two joint sessions with Econometric Society for round-table discussions of "Forecasting Post-War Demand."

The general subject of the first session was "Statistics of Biological Assay," on which 3 papers were presented: "The U.S.P. Assay for Digitalis with Reference to Quality Control," by C. I. Bliss and

B. L. Bartels; "The Application of the Logistic Function to Bioassay," by Colonel Joseph Berkson; and "Studies on the Biological Assay of Penicillin," by E. J. De Beer and Lloyd C. Miller. At the second general session 4 papers were presented. The general subject of the third session was "Statistical Methods in Current Economic-Psychological Problems," on which 4 papers were presented: "Quality Change as a Factor in the Measurement of Real Price," by Margaret G. Reid; "Personnel Selection in the Armed Forces," by John M. Stalnaker; "Analysis of Causation in Opinion-poll Responses," by Paul F. Lazarsfeld; and "Some Hazards in the Prediction of Post-war Consumer Demand," by Ernest R. Hilgard and Ruth S. Tolman.

The first joint session of American Statistical Association and Econometric Society for a round-table discussion of "Forecasting Post-War Demand" was held under the chairmanship of Leonard P. Ayres, Cleveland Trust Company, and the second under the chairmanship of Charles F. Roos, the Econometric Institute, New York.

Econometric Society held four sessions for the presentation of papers in addition to its two joint sessions with the American Statistical Association. The general subject of the first session was "Economic Trends and Fluctuations," under the chairmanship of Benjamin Higgins. Three papers were presented. The subject of the second session was "Statistical Methods in Economics," on which two papers were presented. The last two subjects were "Consumption" and "Investment," on each of which two papers were presented. Attendance, about 50.

#### SECTION ON HISTORY AND PHILOSOPHY OF SCIENCE (L)

(From report by Raymond J. Seeger, secretary)

The program of the section consisted of three symposia and a session at which two vice-presidential addresses were delivered and two papers were presented. The total number of addresses and papers on the four programs was 21.

The first symposium, presented on September 12, was on "History and Philosophy of Science in Post-war Education." The first contribution to this symposium was an address by Dr. Henry E. Sigerist, The Johns Hopkins University, retiring vice-president for the section, on "The History of Science in Postwar Education." The other papers were: "A Lend-Lease Program for Philosophy and Science," by Max Black, University of Illinois; "The Role of the Philosophy of Science in Liberal Education," by Philipp G. Frank, Harvard University; and "Can We Maintain the Ideals Implied in Science?" by Chauncey D. Leake, University of Texas.

The title of the afternoon symposium of the same

day was "Aims and Needs in the Philosophy of Science." The papers presented were: "On the Possible Philosophies of Science," by William Marias Malisoff, Polytechnic Institute of Brooklyn; "The Materialist Bias of Science," by V. J. McGill, Hunter College; "Dialectical Materialism," by John Somerville, Hunter College; "The Task of Developing Epistemology as a Science," by Jonathan Cook, The University of Chicago; and "Questions of a Laboratory Worker to Philosophy," by Aaron Bodansky, Hospital for Joint Diseases, New York.

The third session, on Wednesday morning, consisted of addresses and papers as follows: "Ethicogenesis," by Chauncey D. Leake, University of Texas, retiring vice-president for the section in 1942; "Full Employment after the War; How to Achieve It and Maintain It," by Joseph Mayer, Brookings Institution, vice-president for the section in 1943; "Individualism and Cooperation in Research," by Robert E. Buchanan, Iowa State College; and "Fluctuations in the Concept of Internationalism," by Edward B. Krumbhaar, University of Pennsylvania, vice-president for the section.

At the final session of the section a symposium was held on "Science and the New World," at which 8 papers were presented as follows: "A Science of the People, by the People, and for the People," by William Marias Malisoff; "The Popularization of Science and Its Philosophies," by Gobind Behari Lal; "Mapping Some Effects of Science and Technology on Human Affairs," by S. W. Boggs; "Science and Prejudice," by Gene Weltfish; "The Future of Medical Research," by Henry S. Simms; "What is Scientific Planning?" by W. Rautenstrauch; "The Responsibility of the Scientist to Society," by Aaron Bodansky; and "Science and Education," by John Somerville. Attendance, about 110.

#### SECTION ON ENGINEERING (M)

(From report by P. L. Hoover, secretary pro tem.)

On September 12 and 13 the section held four sessions and a joint luncheon, at which 13 papers were presented. On Tuesday the section held a joint luncheon with the Cleveland Engineering Society, at which an address on "Technology as a Military Asset" was given by Zay Jeffries, Technical Director, Lamp Department, General Electric Company, Nela Park, Cleveland. I. Melville Stein, vice-president for the section, presided.

The first symposium, presented on Tuesday morning and afternoon, was on "Synthetic Rubber," and consisted of 6 technical papers presented by A. J. Gracia, Goodyear Tire and Rubber Company; B. A. Mrowca, S. L. Dart and Eugene Guth, University of Notre

Dame; C. H. Fisher, T. J. Dietz, W. C. Mast and C. E. Rehberg, U. S. Department of Agriculture; M. H. Whitlock, Mellon Institute of Industrial Research; and Hugh Winn and J. Reid Shelton, Case School of Applied Science.

The second symposium, presented jointly with the Section on Medical Sciences, was on "Aviation Medicine." The first session consisted of 3 papers as follows: "Some Advances in the Science of Aviation Medicine in the Army," by Brigadier General Eugene G. Reinartz; "The Physiological Basis of Engineering Advances in Aviation," by Detlev W. Bronk, Office of the Air Surgeon, Army Air Forces; and "The Accident Background of Aircraft Improvement," by Hugh De Haven, Cornell University Medical School. The papers presented in the afternoon session of the symposium were: "Maintained Contraction of Inspiratory Muscles Resulting from Low Tensions of Oxygen," by A. Sidney Harris, Western Reserve University; "A Study of the Selection and Physical Fitness of Air Transport Pilots," by Ross A. McFarland, Harvard University; and "An Appraisal of the Examination of the Eyes of Air Transport Pilots," by Franklin D. Burger, Medical Officer, Northeast Airlines.

#### SECTION ON MEDICAL SCIENCES (N) AND SUBSECTION ON DENTISTRY (Nd)

(From reports by Malcolm H. Soule, Secretary of Section N, and Paul C. Kitchen, Secretary of Subsection Nd)

Section on Medical Sciences held 8 sessions on September 12-15, inclusive, at which 49 papers were presented. The program consisted of a session at which Dr. Oswald T. Avery, Rockefeller Institute for Medical Research, vice-president for the section, delivered an address on "Experimental Induction of Specific and Heritable Changes in Pneumococcal Cells," 4 sessions for symposia and 3 for general sessions. Referring to Dr. Avery's address, there are 32 well-recognized types of the pneumococcus on the basis of serological reactions. These types maintain their identity indefinitely when cultured under ordinary laboratory conditions, and the determination of the type in a pneumococcal infection is fundamental for serum therapy. Dr. Avery reviewed the results of his research in which the type of certain strains was changed at will by cultivation in the presence of dead cells of the desired type. The factor responsible for the transformation has been isolated and subjected to careful chemical analysis. The far-reaching implications of these findings in the field of microbe life were considered in detail.

The meeting of the section opened with a joint symposium with American Society of Parasitologists on

"Parasitology in Relation to the War," at which 6 papers were presented. Considerable doubt existed in the minds of those contributing to the symposium that the so-called tropical diseases will establish themselves in our country in the post-war period, even though a fairly large number of the returning soldiers are infected. It is important, however, to have a more thorough understanding of the reservoirs, vectors, and modes of transmission of the agents of these diseases, in order to protect those who will be stationed in endemic areas.

A joint symposium with the Section on Engineering on "Aviation Medicine," at which 6 papers were presented, was held on Wednesday. For obvious reasons much of the work in this field could not be made public. On Thursday afternoon a joint session with Alpha Epsilon Delta, National Honorary Premedical Fraternity, was devoted to a symposium on "Pre-medical Education."

Three general sessions were held, one on Thursday morning and two on Friday, at which 32 papers were presented. These papers were unusually interesting contributions on various branches of medical science, including cardiology, endocrinology, biochemistry, physiology, immunology, bacteriology, as well as clinical medicine and surgery. The caliber of the material was indicative that fundamental research is being carried out in fields which are not directly related to the war effort, the results of which are nevertheless for the betterment of mankind. Attendance at each session, about 60.

Subsection on Dentistry held two sessions for a symposium on "Fluorine and Dental Caries," at which 11 papers were presented, at each of which the attendance was about 250. The subsection held a luncheon and business session, with an attendance of 65.

#### SECTION ON AGRICULTURE (O) AND AMERICAN SOCIETY FOR HORTICULTURAL SCIENCE

(From report by William A. Albrecht, secretary of the section)

Section on Agriculture, together with Section on Botanical Sciences, Botanical Society of America, American Society of Plant Physiologists and American Society for Horticultural Science, held a symposium on "Nutrition—Some Current Views." The vice-president for the section, Dr. R. J. Garber, U. S. Regional Pasture Research Laboratory, State College, Pa., presented a paper on "Plant Breeding in Relation to Human Nutrition." The other papers were "Microbial Nutrition and Agriculture," by R. E. Buchanan, Iowa State College, and "Plants in Relation to Vitamins," by A. E. Murneek, University of Missouri. Attendance, about 200.

American Society for Horticultural Science par-

ticipated in the symposium on "Nutrition—Some Current Views," held a joint session with American Society of Plant Physiologists and Physiological Section of Botanical Society of America for considering "Growth Regulating Substances," at which 7 papers were presented. In addition, the society held 7 sessions at which 81 papers were presented, and a round-table discussion on plant breeding. The papers were so numerous and the attendance was so large that all sessions except the symposium and the last were held in two sections. The program on Tuesday afternoon was divided into a section on "Fruit Breeding" and one on "Vegetable Crops."

On Wednesday morning the program of one section was on "Vegetable and Floricultural Crops; Growth Substances and Breeding," and the program of the second section was on "Pomology—General." On Wednesday afternoon the program of the first section was on "Vegetable Crops—Tissue Analysis and Nutrients" and the second section continued its program on "Pomology—General." On Wednesday evening the society held its annual banquet at which Dr. W. P. Tufts, University of California, the retiring president of the society, delivered an address.

#### SECTION ON EDUCATION (Q)

(From report of H. H. Remmers, secretary)

Section on Education held, on Tuesday evening, September 12, a joint session with Section on Psychology at which the vice-presidents for the respective sections delivered their vice-presidential addresses. Dr. Harold F. Clark, Columbia University, vice-president for the Section on Education, chose for the subject of his address "How Far is Experimentation in the Social Sciences Possible?" and Dr. Edward C. Tolman, University of California, chose as the subject of his discourse "A Stimulus-Expectancy Need-Cathexis Psychology."

On Wednesday morning the section held a joint symposium with Ecological Society of America on "Teaching Ecology," at which papers were presented by Robert J. Havighurst, The University of Chicago, Neil E. Stevens, University of Illinois, Paul B. Sears, Oberlin College, and J. M. Aikman, Iowa State College. For titles of addresses see report of Ecological Society of America, *ante*. Estimated attendance, over 200.

#### SIGMA DELTA EPSILON

Sigma Delta Epsilon, Graduate Women's Scientific Fraternity (Lela V. Barton, secretary) held its annual council meeting on Tuesday and a Luncheon for All Women in Science on Wednesday, with an attendance of 65, at which Dr. Margaret Mead, executive secretary of the Committee on Food Habits,

National Research Council, delivered an address on "Have Women a Specific Contribution to Make to Science?" A breakfast and the annual business meeting were held on Thursday morning.

#### RESEARCH COUNCIL ON PROBLEMS OF ALCOHOL

Research Council on Problems of Alcohol held its second symposium on "Alcoholism" in a series of sessions for round-table discussions and the presentation of papers continuing through Tuesday and Wednesday, September 12-13. The first symposium meeting of the Research Council was held in connection with the annual meeting of the association in Philadelphia, 1940-41.

The first session, held under the chairmanship of Abraham Myerson, consisted of 5 papers: "Factors Influencing the Occurrence of Ascites in Patients with Alcoholic Cirrhosis of the Liver and the Effect of Liver Therapy on the Reaccumulation of Ascitic Fluid"; "A Report, Clinical and Pathological, on 42 Cases of Wernicke's Syndrome"; "Varieties of Alcoholic Personality"; "Rorschach Analysis as a Means of Determining the Type of Therapy for the Patient, with an Alcohol Problem"; and "The Syndrome of Chronic Alcoholic Addiction." Four papers were presented at an afternoon session: "A Study of the Wives of Twenty Alcoholics"; "Hospital Psychotherapy of the Nonpsychotic Alcoholic"; "The Medical Implications of Alcohol as a Direct or Contributing Factor in the Causation of Death"; and "Ecological and Familial Factors in Alcoholism." This program was followed by a round-table discussion of "The Conditioned Reflex Treatment of Alcoholism." The Tuesday evening program consisted of a paper by Abraham Myerson on "Differential Diagnosis in Relation to Therapy" and a round-table discussion. Another evening session was held under the chairmanship of Lawrence Kolb, consisting of papers by a representative of Alcoholics Anonymous, Robert G. Heath, Major Peter J. Hofman and a round-table discussion by several participants.

On Wednesday morning the Research Council held a round-table discussion on "Alcoholism and War," participated in by Captain F. M. Harrison, Major Ivan C. Berlien, Colonel John H. Baird, Commander Florence Powdermaker, Luther Woodward, R. W. Waggoner, Miss Bell Greve, Major H. J. Lawn, Abraham Myerson, Lieut. Commander A. C. Cornsweet and Mark McCloskey. At the luncheon, Harry Affelder presiding, Dr. Anton J. Carlson presented a paper on "The Community's Responsibility for the Prevention and Treatment of Alcoholics." The Wednesday afternoon program continued the discussion on "Alcoholism and War."



Committee on Alcoholics, Welfare Federation of Cleveland, also presented programs on Tuesday and Wednesday in collaboration with the Research Council on Problems of Alcohol. At the luncheon on Tuesday Dr. Lawrence Kolb, U. S. Public Health Service, delivered an address on "Alcoholism; What is it and How should it be Handled?" On Wednesday, at 2:15 P.M., the committee held three simultaneous discussion sessions, followed by a general session at 4 o'clock. The general subjects for the three groups were: "The Role of Psychiatry and Social Work in the Treatment of Alcoholics," "Prevention of Alcoholism: What Should Youth Be Told," "The Role of the Church in the Treatment of Alcoholics," and "Is a Diagnostic Clinic for Alcoholics a Necessary Part of a Sound Community Program?"

#### AMERICAN SOCIETY OF AESTHETICS

American Society for Aesthetics held its first annual meeting from Monday to Wednesday, inclusive, September 11-13. The president of this recently founded organization is Dr. Thomas Munro, Cleveland Museum of Art, and its secretary is Dr. Max Schoen, Carnegie Institute of Technology. The program of this society makes it clear why its first meeting was held with a meeting of the association.

The general subject of the first program was "Aims and Methods in Aesthetics." It was presented under the chairmanship of Dr. Thomas Munro, and consisted of 5 papers.

The subject of the afternoon session, under the chairmanship of Max Schoen, was "General Theory," on which 5 papers were presented.

On Tuesday morning the general subject of the program was "The Arts: Music, Literature," which was presented under the chairmanship of V. M. Ames.

The Tuesday afternoon program was on "The Visual Arts," Katherine Gilbert, presiding.

At the Tuesday evening dinner, Dr. Thomas Munro delivered an address on "Society and Solitude in Aesthetics."

The final program on Wednesday afternoon was on "The Arts: Various Approaches." It was held under the chairmanship of C. J. Duessle.

#### EXPENSES OF THE CLEVELAND MEETING

Program, editing and printing .....	\$1,452.62
Projection, equipment, rental and operation .....	1,249.50
Auditorium rentals .....	622.00
Press service .....	155.02
Registration sign .....	4.64
Photolithographing room assignment charts .....	8.40
Telegrams and long-distance calls .....	51.01
Travel expenses, Executive Committee .....	330.26
Travel expenses and section expenses, section secretaries .....	886.35
Exhibition, preliminary expenses .....	188.23
Other preliminary expenses .....	19.41
Registration cards .....	14.80
Academy Conference Dinner .....	70.75
	<b>\$5,052.99</b>

#### MINUTES OF THE COUNCIL MEETING

(From report by Otis W. Caldwell, General Secretary)

The Council meeting was held in two sessions, the first from 2 P.M. to 4:10 P.M., on Monday, September 11, and the second from 8:30 A.M., to 9:55 A.M., on Wednesday, September 13. The total membership of the Council is 255, of whom 42 attended the first session and 38 the second session. Of the 42 present at the first session, only 20 were present at the second session.

At the session of the Council held on September 11 the following actions were taken.

1. It was moved, seconded and unanimously voted to approve the election of officers of the association by mail ballot, as in 1942 and 1943, and to instruct the Office of the Permanent Secretary to proceed with the election.

2. The revised constitution was reported by the special committee on its revision, as approved by the Executive Committee and recommended for adoption. After a motion for amendments was lost, it was voted to recommend the revised constitution, as submitted by the Executive Committee, to the General Session of the association to be held on Monday evening, September 11, for the address of the retiring president of the association, Dr. Isaiah Bowman. (The revised constitution was presented by Dr. Carlson, president. On a call for a *viva voce* vote on the adoption of the constitution as submitted, all votes, except one, were favorable. Consequently, the revised constitution was not finally adopted by the vote. However, under a provision of the existing constitution still in effect, it "may be amended at a general session by unanimous vote or by a majority vote at two consecutive annual meetings." Presumably the revised constitution voted on at Cleveland will be presented for a second consideration at the next annual meeting of the association.)

3. Upon his request Mr. Ware Cattell was given an opportunity to address the Council for 15 minutes.

4. The Permanent Secretary reported that the membership of the association on September 11 exceeded 25,000.

5. A brief report on the publications of the association was made by the Permanent Secretary, who announced that Dr. Charles S. Stephenson had been appointed editor of *SCIENCE* by the Executive Committee until December 31, 1945.

6. The General Secretary, following discussions, urged members of the Council to send to him ideas about more profitable meetings of the Council and stated he would summarize and distribute the recommendations.

At the second session of the Council, held on September 13, the following actions were taken.

1. Minutes of the first session were read and approved.

2. After a general discussion of a possible change in the time of the annual meeting of the association, it was moved by George A. Baitsell, seconded by A. F. Blakeslee, and carried that the problem be placed before the entire Council for decision by mail ballot.

3. The question of better pre-planning for future meetings of the Council was raised by P. W. Zimmerman. A. F. Blakeslee then presented the following three motions:

(A) That the Council instruct the Executive Committee that the amendments voted on (motions not carried) at the Council meeting of September 11, 1944, be presented at the earliest feasible opportunity;

(B) That pending action on these amendments, the Executive Committee be instructed not to nominate for immediate reelection any member of the Executive Committee who has served a four-year term;

(C) That the Executive Committee be instructed, after the present meetings of the A.A.A.S., to send out by mail to members of the Council, in adequate season before its meeting, agenda of matters expected to be brought up for discussion, including nominations for administrative officers.

The above motions were separately considered, and all three motions were carried.

The three proposed amendments to the Constitution, as printed in *SCIENCE*, September 1, 1944, and referred to in the first of the foregoing three motions, follow:

Article III, Section 3, tenth and eleventh lines shall read: "The Administrative Secretary, Assistant Administrative Secretary, General Secretary, and the Treasurer shall be elected by the Council on nomination by the Executive Committee, or on nomination by five members of the Council."

Article IV, Section 3, lines 14-17. Instead of the sentence beginning line 14: "At any election . . ." substitute the following: "Elected members of the Executive Committee shall be ineligible to re-election immediately after having served four-year terms."

Article IV, Section 6, in lines 2 and 3, delete "shall include at least two members of the Council and . . ."

4. The National Roster of Scientific and Specialized Personnel was discussed by Dr. Roger C. Smith, who moved that the president of the association appoint a committee of three to study the National Roster for the purpose of better acquainting this association with the roster and to make recommendations both to the association and the roster as to how the roster may serve scientists and science more effectively.

An amendment was proposed, changing the number

of the proposed committee to five. Carried unanimously.

A motion was then made to refer the proposal to the Executive Committee with power to act. Motion did not carry. The original motion as amended was then carried unanimously.

5. It was moved by L. K. Frank that the president of the association shall appoint a committee to cooperate with other such committees from other major scientific organizations, to consider the feasibility of establishing a body which might be designated by some such term as the National Science Planning Board, to formulate national policies for research and to report back to the Council. Carried unanimously.

The Council adjourned at 9:55 A.M.

(Signed) OTIS W. CALDWELL,  
General Secretary

### THE ACADEMY CONFERENCE

(From reports by Otis W. Caldwell, General Secretary, and V. Earl Light, secretary of Academy Conference)

The academy conference was held on Monday, September 11, convening at 4:15 P.M. Dr. V. Earl Light, secretary of the conference, asked Dr. L. J. Thomas to serve as chairman in the absence of the regular chairman, Dr. S. W. Bilsing.

The following program was given: "How May State Academies and Citizens Increase Their Mutual Services?" by E. C. L. Miller, Medical College of Virginia, and W. A. Dayton, U. S. Department of Agriculture, and others; "Discussion of Methods in Administering A.A.A.S. Grants to State Academies," by L. R. Tehon, Illinois Natural History Survey, and others; "Report of the Committee on Junior Academies of Science," by L. J. Thomas, University of Illinois; "Distribution and Discussion of the Report of the Committee on Publications of the Academies of Science in the United States and Canada," by Roger C. Smith, Kansas State College, and others. The discussions were vigorous, occupying all the time available. The complimentary dinner given by the A.A.A.S. to delegates from academies was attended by 25 representatives of academies and officers of the A.A.A.S. At the dinner, Dr. A. J. Carlson and Dr. Harlow Shapley addressed the meeting. The conference adjourned at 8:00 o'clock in order that those present might attend the first general session of the association meeting at which President Bowman's address was given. All officers of the conference were reelected for 1945: *President*, S. W. Bilsing; *Vice-president*, G. W. Prescott; *Secretary*, V. Earl Light. Attendance, 26 representatives of affiliated academies and guests.

## OBITUARY

## RECENT DEATHS

SIMON HENRY GAGE, professor of histology and embryology, emeritus, of Cornell University, died on October 20 at the age of ninety-three years.

DR. CHARLES BERNARD LIPMAN, professor of plant physiology and dean of the graduate division of the University of California, died on October 22. He was in his sixty-first year.

DR. CHARLES LEWIS THORNBURG, emeritus professor of mathematics and astronomy of Lehigh University, died on October 14. He was eighty-two years old.

WILLIAM BAUSCH, chairman of the board of the Bausch and Lomb Optical Company and the last surviving son of John Jacob Bausch, who founded the company with Captain Henry Lomb in 1856, died on October 19. He was in his eighty-fourth year.

DR. JAMES A. BABBITT, professor emeritus of clinical otolaryngology of the School of Medicine of the

University of Pennsylvania, died on October 16 at the age of seventy-four years.

DR. J. C. RATSEK, for the past nine years horticulturist at the Texas Agricultural Experiment Station, in charge of investigations on roses at Substation No. 2, Tyler, died on October 5 at the age of forty-one years.

DR. OLIVER ATKINS FARWELL, who retired in 1933 as curator of the herbarium and drug inspector of Parke, Davis and Company, died on September 18 in his seventy-seventh year.

PROFESSOR SIR JOHN LEDINGHAM, F.R.S., formerly director of the Lister Institute of Preventive Medicine and professor of bacteriology at the University of London, died on October 4 at the age of sixty-nine years.

DR. EUGEN OBERHUMMER, professor of political and historical geography of the University of Vienna, retired, died on May 4 at the age of eighty-five years.

## SCIENTIFIC EVENTS

## THE UNITED NATIONS STANDARDS COORDINATING COMMITTEE

MARKING the first step in the resumption of work on international standardization halted by the war, the newly organized United Nations Standards Coordinating Committee opened a New York office on October 16.

In order to carry out its work effectively, the committee will maintain two offices, one in London, at the base of European operations, and one in New York, since so many of the war and relief supplies come from this side of the Atlantic. The London office is already operating under the direction of Charles C. LeMaistre, formerly director of the British Standards Institution. The New York office is at 70 East 45th Street. Each office will work with a certain group of countries, and each will keep the other in close touch with its activities.

The purpose of the United Nations Standards Committee is to promote cooperation between the allied belligerent countries in standardization matters as an aid to the production and use of war supplies and equipment and also in relief work. It seeks to secure the maximum possible coordination of standards necessary for the war effort and for the immediate post-war period.

Planning for this committee has been done at a series of international meetings in Washington, New York, Toronto and London. The most recent meetings took place in London on August 29 and September 8. They were attended by delegates from Aus-

tralia, Canada, Great Britain, New Zealand and the United States, and by an observer from Russia. South Africa, while not able to send a representative, has expressed the intention of joining the United Nations Standards Committee and helping to support it. Invitations to join have been issued to Mexico, Brazil and China.

The committee is set up for a period of two years. A review of its work is planned at the end of that time. Participation in the work will be open to the national standardizing bodies of such of the United Nations as may desire to take part in and support the work.

The committee has been requested to undertake (1) work on building materials and equipment (requested by the Industrial Rehabilitation Division of the UNRAA); (2) standardization of flat bottom rails needed to rebuild the heavily damaged transportation systems of France and the other occupied countries (suggested by the Inter-Allied Transportation Committee); (3) a project for the suppression of radio interference (suggested by the British Standards Institution).

Herbert J. Wollner, of Washington, D. C., has been made head of the New York office. Howard Coonley, director of the Conservation Division of the War Production Board, has been appointed the official representative of the American Standards Association on the Coordinating Committee, which consists of representatives of Great Britain, Canada, Russia and the United States; and P. G. Agnew, secretary of the as-

sociation, has been named a member of its Executive Committee.

### THE NATIONAL INDUSTRIAL CHEMICAL CONFERENCE AND THE CHEMICAL EXPOSITION

A NATIONAL Industrial Chemical Conference will be held at the Coliseum in Chicago from November 15 to 19. The National Chemical Exposition will be held at the same time and place.

At noon on Wednesday, preceding the opening of the conference, a joint luncheon will be given at the LaSalle Hotel with members of the Chicago Association of Commerce and the Chicago Section of the American Chemical Society taking part. Following the luncheon a meeting will be held at which "New Research Developments in Industry" will be discussed by Dr. Roy C. Newton, of Swift and Company; J. K. Roberts, of the Standard Oil Company (Ind.), and Dr. Ernest H. Volwiler, of the Abbott Laboratories. M. H. Arveson, of the Standard Oil Company, chairman of the exposition, will preside.

The subject of the evening session will be "Metals, Present and Future" with Dr. C. W. Balke, of the Fansteel Metallurgical Corporation, as chairman. The following addresses are planned: "New Developments in and Future Developments for Aluminum" by Dr. P. V. Faragher, of the Aluminum Company of America; "Magnesium in Peace-Time Economy" by L. B. Grant, of the Dow Chemical Company, and "Hardenability Bands for Alloy Steels" by J. Mitchell, of the Carnegie-Illinois Steel Corporation.

At the meeting on Thursday afternoon under the chairmanship of V. Conquest, director of research of Armour and Company, the discussions will be devoted to the subject of "The Chemist in Pharmaceutical Manufacture." The speakers and their subjects will be Dr. C. R. Addinall, of Merck and Company, Inc., "Synthesis and Production of Vitamins"; Dr. D. L. Tabern, Abbott Laboratories, "The Chemist Looks at Anesthesia"; and Dr. John F. Norton, of the Research Laboratories of the Upjohn Company, "Research in the Production of Penicillin and Other Antibiotics."

A discussion on "The Achievements of the Chemical Engineer" is planned for the evening, with Dr. Gustav Egloff, of the Universal Oil Products Company, as chairman, at which Dr. George Granger Brown, professor of chemical engineering of the University of Michigan, will speak on "The Petroleum Industry" and J. Collyer, of the B. F. Goodrich Company, on "The Synthetic Rubber Industry."

A dinner at 6:30 P.M. on Friday evening will be followed at 8:00 P.M. by a joint meeting with the Chicago Section of the American Chemical Society, with R. E. Zinn as chairman. Dr. C. F. Kettering, of the Research Laboratories Division of the General Motors Corporation, will make an address entitled "Current Contributions of the Chemist and Chemical Engineer to Human Progress."

On Saturday morning Dr. C. S. Marvel, of the University of Illinois, will preside at a forum discussion at which A. L. Elder, of the Corn Products Refining Company, will speak. His address will be entitled "What Is a Chemist and Chemical Engineer?"

Personally conducted tours of the exhibits for high school and college students of chemistry and their teachers have been arranged for Saturday morning.

### MEMORIAL MEETING IN HONOR OF MARIE SKŁODOWSKA CURIE

To mark the tenth anniversary of the death of Marie Skłodowska Curie, a memorial meeting in her honor was held at Columbia University by the Polish Institute of Arts and Sciences in America at 8 P.M. on Friday, October 20. Six Columbia departments, including chemistry, chemical engineering, East European languages, medicine, physics and radiology, took part.

H. E. Sylwin Strakacz, Minister Plenipotentiary and Consul General of Poland in New York, delivered an address. A message from Dr. Robert A. Millikan, of the California Institute of Technology, was read. Professor Marston Taylor Bogert, of Columbia University, president of the International Union of Chemistry and honorary member of the Chemical Societies of Poland and France, presided.

Professor W. Swietoslawski, of the Mellon Institute, Pittsburgh, vice-president of the Polish Academy and of the International Union of Chemistry, formerly rector of the Warsaw Polytechnic Institute, spoke on "The Legend of Madame Curie." Professor Casimir Fajans, of the University of Michigan, a member of the Polish Academy, gave an illustrated lecture on "The Discovery of Radium and the Modern Development of Chemistry and Physics."

Other speakers included Professor L. Brillouin, Collège de France, president of the Section of Sciences, Ecole Libre des Hautes Etudes, and the following six representatives of the cooperating departments of Columbia University: Professor Arthur W. Thomas, Professor Arthur W. Hixson, Professor Clarence A. Manning, Professor Ross Golden, Professor George B. Pegram and Professor Gioacchino Failla.

## SCIENTIFIC NOTES AND NEWS

THE Legion of Merit has been awarded in Paris to Colonel David Sarnoff, of New York, president of the Radio Corporation of America, "for ingenuity and

resourcefulness in restoring cables severed by the enemy," and for his work with the U. S. Signal Corps of the Supreme Allied Expeditionary Force in pre-



paring news communications for the invasion and later.

THE Oak Leaf Cluster to the distinguished service medal has been presented to Brigadier General Edgar Erskine Hume, of the Surgeon General's Office, "in recognition of his highly successful administration of the City of Naples."

THE Thurman H. Bane Award, given annually by the Institute of the Aeronautical Sciences for the most important technical achievement by an officer or civilian of the Air Technical Service Command, will be conferred for 1944 on Colonel Donald J. Keirn, of Wright Field, in recognition of his work in the development and production in quantity of the turbo-jet engine.

THE Oersted Medal for 1943 of the American Association of Physics Teachers has been conferred on Dr. Roland R. Tileston, of Pomona College, Claremont, Calif., since 1943 director of the pre-meteorological program for the Air Forces, U. S. Army.

ROBERT B. HARPER, vice-president in charge of research of the Peoples Gas Light and Coke Company of Chicago, was presented with the honor scroll of the Chicago Chapter of the American Institute of Chemists at a testimonial dinner held in Chicago on October 6. He has completed almost forty years of service with that company. One of the addresses was made by Professor Harry McCormack, his former teacher, who is now director of the department of chemical engineering of the Illinois Institute of Technology.

DR. JOHN DEWEY, professor of philosophy, emeritus, of Columbia University, celebrated on October 20 his eighty-fifth birthday.

THE University of Maryland conferred on September 29 the honorary degree of doctor of science on Major General Norman T. Kirk, U.S.A., Surgeon General of the Army.

DR. KENT R. VAN HORN, of Cleveland, research metallurgist of the Aluminum Company of America, was elected at the Cleveland meeting on October 18 president of the American Society for Metals, and Dr. Charles H. Herty, Jr., research engineer and assistant to the vice-president of the Bethlehem Steel Company, was made vice-president.

JOHN H. BAKER, for many years executive director of the National Audubon Society, was elected to the presidency of the society at a meeting of the board in New York City on October 17. Ludlow Griscom, of Cambridge, Mass., was elected chairman of the board. Dr. William E. Wrather, director of the U. S. Geological Survey; Aubrey Drury, of San Francisco,

and Dr. E. Laurence Palmer, professor of rural education at Cornell University, were elected directors.

DR. WILSON MARTINDALE COMPTON, for the last twenty-five years director of the National Lumber Manufacturers Association, has accepted the presidency of the State College of Washington to succeed Dr. Ernest O. Holland, who retired recently after nearly thirty years service. Dr. Compton is a governor of the International Forestry Commission of Brussels and a fellow of the Royal Economic Society of Great Britain.

DR. CHARLES R. KEYES, professor emeritus at Cornell College, Mt. Vernon, Iowa, has been named visiting professor of anthropology at the State University of Iowa. According to an announcement made by Dr. C. E. Seashore, acting dean of the Graduate School, it is planned to establish a class of professors having no teaching responsibility who would be engaged entirely in research work.

DR. JAMES C. ANDREWS, professor of biologic chemistry and head of the department at the School of Medicine of the University of North Carolina, is serving from September 1 to January 1 as exchange professor of biological chemistry and nutrition at the Medical School of the National University of Guatemala.

DR. W. H. COWLEY, president of Hamilton College, formerly professor of psychology at the Ohio State University, has presented his resignation to the Board of Trustees.

DR. ALEXANDER J. ALLEN has been appointed Westinghouse graduate professor of engineering at the University of Pittsburgh.

DR. LYMAN BENSON, of Stanford University, has been appointed associate professor of botany at Pomona College on the Henry Kirke White Bent Foundation. Dr. Stanley Davis Wilson, professor of chemistry and dean of the College of Natural Science at Yenching University, has been appointed visiting professor of chemistry.

DR. THOMAS FERGUSON, deputy chief medical officer of the Department of Health for Scotland, has been appointed to the chair of public health at the University of Glasgow. He succeeds Professor James Mackintosh, who has been appointed to the newly established professorship of public health at the London School of Hygiene.

AN Associated Press dispatch from Paris, dated October 19, reports that Dr. Alexis Carrel is gravely ill.

DR. W. C. SCHROEDER, of the U. S. Bureau of Mines, has become acting chief of its newly established office

of synthetic liquid fuels. He will direct a five-year program of research and development on gasoline and oil from sources other than natural petroleum.

GILBERT J. HAEUSSLER, senior entomologist of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, D. C., has been named chief of the Division of Insect Pest Survey and Information.

At the New York meeting of the American Chemical Society it was planned to prepare a history of the society. Dr. Charles A. Browne, consultant of the Bureau of Chemistry and Soils of the U. S. Department of Agriculture, has been appointed editor.

THE committee for medical research of the British Privy Council has appointed Dr. A. N. Drury, director of the Lister Institute of Preventive Medicine, and Dr. J. C. Spence, professor of child health at the University of Durham, members of the Medical Research Council.

DR. MORRIS A. STEWART, associate professor of parasitology at the College of Agriculture of the University of California, has returned to the university after three months spent in South America, chiefly in Bolivia, as consulting parasitologist to the Government. In Bolivia, Dr. Stewart set up a public health service and a service for the protection of domestic animals, making the necessary surveys and getting the work under way. He had his headquarters in Santa Cruz, where at the Instituto Superior de Medicina Veterinaria and the Instituto Orientale de Biología he was made honorary professor of parasitology. He spent several weeks traveling through jungles and over other parts of Bolivia. He also made a study of parasitic diseases in Rio de Janeiro and in São Paulo, Brazil, and attended conferences in Peru on plague epidemic conditions.

A. E. PORSILD, curator of the National Herbarium, and Dr. A. L. Rand, curator of the National Bird Collection, both of the National Museum of Canada at Ottawa, have returned from an expedition to the Yukon Territory. They spent four months in the country adjacent to the Canol Pipe Line, between Whitehorse and MacMillan Pass in the Mackenzie Range, where they made a detailed study of the flora and fauna and obtained extensive collections of plants, birds and mammals. From MacMillan Pass a reconnaissance trip was made down the east slope of the Mackenzie Mountains to the banks of the Mackenzie River. The expedition left Edmonton in May, traveling over the Alaska Highway and the Canol Road and returned in September over the same route.

DR. CHARLES F. KETTERING gave on October 23 an address entitled "Can the Principles of Industrial

Engineering Research be Applied to Medicine?" at the annual dinner of the Association of American Medical Colleges, which met at the College of Medicine of Wayne University.

PROFESSOR GEORGE B. CRESSEY, of Syracuse University, delivered the Haas lectures in geography at Northwestern University on October 19 and 20. His subjects were "Report from Asia," "How to Defeat Japan," and "Pictures from China," based upon his recent trip to Asia. While in the Middle West he also lectured at the University of Chicago, Cornell College in Iowa and before the Oak Park Institute of International Affairs.

THE annual meeting of the Association of Land Grant Colleges was held in Chicago from October 24 to 26 under the presidency of Dr. C. B. Hutehinson, dean of the College of Agriculture of the University of California.

A MEETING of the Eastern Section of the American Federation for Clinical Research will be held at Boston on December 9. Papers will be read at the Massachusetts General Hospital, and organized activities are planned at other hospitals. Investigators desiring to read papers on clinical research should submit an abstract of not over 200 words to Dr. Orville Bailey, Harvard Medical School, 25 Shattuck Street, Boston, before November 15. Details of the program will be announced later; the meeting will be open to members of the medical profession.

THE annual meeting of the Medical Society of Virginia was held at Richmond on October 23, 24 and 25 under the presidency of Dr. C. B. Bowyer. Guest speakers were the Honorable Colgate W. Darden, Jr., Governor of Virginia; Dr. Alexis F. Hartmann, professor of pediatrics, Washington University, St. Louis; Dr. John B. Youmans, Colonel, Medical Corps, professor of medicine, Vanderbilt University, now director of the Nutrition Division, Army Service Forces, Office of Surgeon General, and Dr. Wallace E. Herrell, consultant in medicine, Mayo Clinic, and assistant professor in medicine of the Mayo Foundation Graduate School at Rochester of the University of Minnesota. The program included a symposium on nutrition, sponsored by the Medical College of Virginia; a full program of professional papers and a scientific exhibit.

THE twenty-fourth annual meeting of the Highway Research Board, which was to have been held in Cincinnati from November 22 to 25, has been postponed at the urgent request of the Office of Defense Transportation that all conventions be cancelled for the remainder of 1944.

By the will of Mrs. James T. Pardee, of Midland, Mich., securities worth \$1,000,000 are set aside for research on the control and cure of cancer. The value of the estate is estimated at \$6,000,000.

DR. HARRY L. HOLLINGSWORTH, professor of psychology at Columbia University, has given \$51,000 to establish a fellowship at the university in memory of his wife, Leta Stetter Hollingsworth, professor of education at Teachers College, who died in 1939. The fellowship will be awarded annually to a woman graduate of the University of Nebraska who "is most likely to

emulate the character and career of the late Mrs. Hollingsworth."

THE herbarium of the late Dr. Oliver Atkins Farwell, containing some forty thousand Michigan plants, has been bequeathed to the Cranbrook Institute of Science at Bloomfield Hills, Mich.

THE Army Ordnance Distinguished Service Award was presented on October 12 to the American Society for Testing Materials, in recognition of "its contributions toward the development, manufacture and maintenance of ordnance materiel."

## DISCUSSION

### FUNDAMENTAL BIOLOGICAL RESEARCH IN WARTIME

"SCIENCE" often takes a long time to reach New Guinea. I recently received the April 7 issue, and was happy to read the results of Dr. Curt Stern's inquiry concerning the advisability of continuing fundamental biological research in wartime. Here is yet another "yes" for unqualified continuation.

I do not think any of us who favor continuation of fundamental research in wartime mean to imply that the relatively non-productive research worker, old or young, should be kept at his job when he could probably find himself a more suitable and more useful occupation in the armed services or in war work. We also do not mean to imply that a research worker of proved ability should stick to his fundamental, long-range research, if a very definite need exists for the solution of a practical problem for which he is exceptionally well suited by training and talent.

Many capable research workers will not find such an opportunity, and it is hard to see how they can do better than to continue with fundamental research. People capable of doing original, imaginative research are none too numerous. For individuals who have demonstrated such ability to do essentially laboratory technician's work in the Army or in some war research project is as much a waste as to use a six-wheeled truck to transport 20 pounds of equipment. Jeeps are usually available, and so are people who can do routine work but not original research.

Too many biologists have tended to worry too much about the "usefulness" of their research projects. The best research is generally done when the worker is doing it because he enjoys it and wants to find an answer to some question of interest to him. No one knows what findings in fundamental research will ultimately prove useful in one way or another. It is a fine thing when some discovery in fundamental research leads to an improvement in the health or general welfare of the community, or even merely to

some handy gadget. But ultimate usefulness should not be held out as the sole reason for the carrying out of fundamental scientific research. Man wants to understand his environment for the sake of the mental satisfaction such understanding brings, as well as for the sake of the material benefit which often follows such understanding.

The discovery and description of natural phenomena and their interrelationships is a cultural activity of the highest order. There is in an understanding of natural science, a sense of beauty as definite and distinct as in the appreciation of a work of art. This value of science has been too long neglected. The popularizers of science harp upon its usefulness. Behold, they say, science gives us a better toothbrush! (and, say the opponents of science, also bigger and better bombs). A better toothbrush is nice to have, and the better bombs are coming in very handy, but science involves so much more than this. The general public should be made more thoroughly aware of these other values to be derived from scientific knowledge and education. Then workers in fundamental lines of research, which do not seem to be leading to better toothbrushes, will no longer need to feel apologetic about their activities.

WILLIAM TRAGER,  
1st Lieutenant Sn.C.

### COMMENTS ON COMPARATIVE STUDIES IN HUMAN BIOLOGY

IN his comments on Professor Herskovits's criticism<sup>1</sup> of Professor Dice's remarks<sup>2</sup> Professor Strandkov writes: "If primary human stocks (Mongoloid, Negroid and Caucasoid) and if subdivisions of these major groups ('races') have any validity at all, and the author believes that Professor Herskovits will admit that they do have some, it seems almost inevitable that both physiological and inherent response differences must exist."<sup>3</sup>

<sup>1</sup> SCIENCE, n.s., 100: 50-51, 1944.

<sup>2</sup> *Ibid.*, n.s., 99: 457-461.

At first blush this seems a reasonable enough statement, but when one inquires why it appears to be so it will be found that it is because it is suspected that physical characters are probably linked with functional ones, that there is a genetic linkage between the genes for the two different orders of phenomena. If such is the ground upon which this assumption is usually made then it ceases to be a reasonable one, for the good reason that it is based on no more than a suspicion or a "hunch" and not upon facts which are known to exist or have been demonstrated. I personally have a "hunch" that genes play an enormous part in the determination of behavior, but though I have much sympathy for Professor Strandskov's view, I see no ground for believing that there is any necessary connection between statistically aggregated physical characters and particular types of functional response.

Genetic linkage between particular physical traits and particular psychological traits is a phenomenon unknown outside folk belief.

The results of forty years of psychological testing and study of the major groups of mankind has pretty consistently followed the pattern of the results obtained by the first anthropological expedition ever to go into the field for the purpose of studying the psychological and physiological responses of such a group of mankind, the Cambridge Anthropological Expedition to the Torres Straits.<sup>3</sup> This expedition, under the leadership of Professor A. C. Haddon, and comprising, among others, the following members, Wm. McDougall, W. H. R. Rivers, C. S. Myers and C. G. Seligman, contrary to general expectation found no inherent psychological or physiological differences which would serve to distinguish the natives of Torres Straits from their investigators or from any other people with whom they were acquainted. Since then whenever the investigations have been conducted by unprejudiced workers (and fortunately they have been in the majority) the results have been uniformly the same. Summarizing these results for the psychological tests, Professor Otto Klineberg, after considering the evidence from every standpoint, writes, "We may state with some degree of assurance that in all probability the range of inherited capacities in two different ethnic groups is just about identical."<sup>5</sup>

As for the physiological differences which are said to be "inevitable" I am not aware that there is any ground for believing that these are either "many" or significant. Professor Strandskov speaks of "varia-

tions which have a physiological basis." This statement is unclear. Are these variations of a functional or are they of a structural or physical kind? Since Professor Strandskov writes that "many of these variations have been shown to be represented by different gene frequencies within different primary stocks and even within groups recognized as races" I can only take him to mean that these variations refer to structural or physical characters. If this is what Professor Strandskov means, then he is saying something very different from Professor Dice when the latter wrote that "it is recognized by anthropologists that many races also exhibit clearly marked peculiarities of physiology and psychology." As Professor Herskovits pointed out, practically all anthropologists not committed to the racist dogma hold exactly the opposite. Professor Dice's statement is therefore incorrect. He wishes upon anthropologists views which they do not hold.

Since the matter is one of the first importance it would be interesting to know what the "variations" which Professor Strandskov has in mind are. Professor Strandskov's *obiter dictum*, that if there do exist stock or group differences among mankind there is no reason for considering one group as inherently superior to the other, will strike a sympathetic chord. But to the present writer, at any rate, the evidence does not suggest, as it does to Professor Strandskov, that these differences "will in all probability be found to be numerous." My own view is the exact opposite of that.

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#### THE CORRECT NAMES OF PARASITES IN HUMAN MALARIA

SABROSKY and Usinger<sup>1</sup> contributed an interesting article on the nomenclatorial status of human malaria parasites. After reviewing the present situation they propose, in order to regularize it, to bring the whole matter to the attention of the International Commission on Zoological Nomenclature, asking for a suspension of the rules and the official acceptance of the *de facto* names used by most parasitologists. The same action, although in slightly different grounds, was recently proposed by the writer.<sup>2</sup>

I almost entirely agree with the opinions held by Sabrosky and Usinger, but I don't completely support the names they propose as most adequate for the three common species of human malaria parasites; at least in the exact way they write them.

<sup>1</sup> W. C. Sabrosky and R. L. Usinger, *SCIENCE*, 100: 190-192, 1944.

<sup>2</sup> E. Beltrán, *Gaceta Médica de México*, 74: 61-74, 1944.

<sup>3</sup> *Ibid.*, n.s., 100: 146-147.

<sup>4</sup> A. C. Haddon (editor), "Reports of the Cambridge Anthropological Expedition to the Torres Straits," Cambridge, 6 vols., 1901-1935.

<sup>5</sup> O. Klineberg, "Mental Testing of Racial and National Groups," in "Scientific Aspects of the Race Problem," p. 284, Longmans, New York, 1942.



I think the name *Plasmodium vivax* (Grassi and Feletti, 1890) for the tertian parasite is perfectly right. But I don't suppose it is justifiable to call the quartan malaria parasite *Plasmodium malariae* (Feletti and Grassi, 1889, 1890). It should be a very dangerous and confusing procedure for the application of the Law of Priority to include references to more than a single dated work for a name; either their 1889 preliminary communication is the correct basis for the name, and reference to the 1890 paper must be dropped, or *vice versa*. Moreover, it seems to me that Feletti and Grassi did not clearly differentiate tertian from quartan parasites on any or both contributions. It is better to accept as the first clearly limited distinction of the quartan parasite that proposed in 1890 by Grassi and Feletti as *Haemamoeba malariae*, and call the organism accordingly *Plasmodium malariae* (Grassi and Feletti, 1890).

In regard to the parasite of malignant tertian malaria, the name proposed by Sabrosky and Usinger is *Plasmodium falciparum* Welch (1897). This form, the same employed by the Malaria Commission of the League of Nations,<sup>3</sup> is clearly incorrect, because Welch called this parasite *Hematozoon falciparum*, and being later transferred to the genus *Plasmodium*, the original author's name must be written in parenthesis.

Coatney and Young,<sup>4</sup> in a very illuminating discussion of the taxonomy of human malaria parasites, propounded the same designations here supported as the proper *de facto* names to be used.

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#### THE GENERIC NAME OF THE SAND FLY

THE attention of the executive committee of the International Commission has been drawn to the communications regarding the generic name of the sand fly by Dr. William F. Rapp, Jr., which appeared in the issues of *SCIENCE* for April 28 and August 11, last, and by Dr. Charles T. Brues in the issue for May 26, last.

The proposed abandonment of the emended spelling *Phlebotomus* Agassiz, 1842, in favor of the original spelling *Flebotomus* used by Rondani when he first published this name in 1840, affects not only workers in systematic zoology but also—and perhaps especially—workers in the medical field in view of the enormous literature regarding the role played by this fly in the spread of disease. It is clearly of great importance that, in order to prevent confusion from arising, the correct spelling of this generic name should be settled as soon as possible. In view of the fact that the issue involved turns upon the interpretation of Article 19 of the International Code of Zoological Nomenclature, it appears to the executive committee that this is a matter which should be referred for decision to the International Commission on Zoological Nomenclature, as the authority officially charged with the duty of interpreting the application of the International Code in cases of difficulty. Communications in regard to this matter should be addressed to the International Commission on Zoological Nomenclature at their Publications Office, 41, Queen's Gate, London, S.W.7.

FRANCIS HEMMING,

Secretary, International Commission  
Zoological Nomenclature

## SCIENTIFIC BOOKS

### SPECTROSCOPY

*Experimental Spectroscopy*. By RALPH A. SAWYER.  
viii + 323 pp. 107 figs. 16 × 23½ cm. New York:  
Prentice-Hall, Inc. 1944. \$3.75.

THE author states in the preface that "The purpose of this book is to discuss prism and grating spectrographs and the techniques of their use in research. It is designed for students of spectroscopy and for those in research laboratories who wish to make use of spectroscopic procedures. For this reason, extensive mathematical treatments have been avoided; a background of general physics and some physical optics should be sufficient for an understanding of the presentation."

<sup>3</sup> Comité rapporteur de la Commission du paludisme, *Bull. Org. d'Hyg.*, 9: 139-262, 1940.

<sup>4</sup> G. R. Coatney and M. D. Young, *Publication No. 15 of the A. A. S.*, pp. 19-24, 1941.

Successive chapters and pages of the book deal with (1) "The History of Spectroscopy," 1-17; (2) "Light Sources," 18-27; (3) "Spectroscopic Apparatus—General Principles," 28-46; (4) "Prism Spectroscopes and Spectrographs: Theory and Construction," 47-83; (5) "Prism Spectroscopes and Spectrographs: Types and Use," 84-120; (6) "The Diffraction Grating: Theory and Production," 121-144; (7) "The Diffraction Grating: Mountings and Use," 145-182; (8) "The Photographic Process," 183-204; (9) "The Determination of Wavelength," 205-243; (10) "The Determination of Spectral Intensity," 244-276; (11) "Apparatus and Methods of Infrared Spectroscopy," 277-287; (12) "The Spectroscopy of the Vacuum Ultraviolet," 288-295; (13) "Spectrochemical Analysis," 296-310.

The need for a book of this kind has been growing for two decades during which extraordinary develop-

ments (structural analyses of spectra, Raman effect, quantitative spectrochemical analysis, etc.) in pure and applied spectroscopy greatly increased the number of spectrographs and spectrographers. In recent years a considerable number of new and improved types of commercial spectrographs has become available, especially for spectrochemical analysis, which now engages many hundreds of instruments and possibly thousands of workers, but the information needed for critically adjusting, testing and operating such instruments has been scarce and scattered. In "Experimental Spectroscopy" the general principles of spectroscopic apparatus, the theory and performance of prisms and gratings are adequately presented, commercial spectrographs and auxiliary apparatus (light sources, microphotometers, comparators, etc.) are portrayed, and photographic procedures for recording spectra, measuring wavelengths and relative intensities are discussed in extensive practical detail.

For a first edition this book appears to be remarkably free from errors. A few misstatements such as (p. 19) "At ordinarily attainable temperatures, hot solids are most useful as sources in the visible and near-infrared regions, since their spectra reach their maximum in the near-infrared and fall off rather rapidly on the red side and more gradually toward the violet," and (p. 277) "500  $\mu$  (500,000A)" may be explained as inadvertences.

Four schematic diagrams, Figs. 17, 34, 54, 100, may be criticized as being unnecessarily inaccurate, or violating fundamental principles of optics, but one of these is by "Courtesy of Adam Hilger, Ltd."

Never before have so many directions, instructions and suggestions for adjusting, testing and using spectrographs been collected in one volume. Still it is incomplete in this respect. For example, no warning is given to avoid double exposures, or wasting exposures on the shutter or dark-slide, and no mention is made of attempts to prevent such accidents by automatic devices on certain commercial instruments. Again, photographic plate processing is discussed in minute detail but the ruby-lamp-reflection test, or tongue test in total darkness, to avoid loading plates upside down, are not mentioned. The importance of avoiding dust and mars on photographic plates is stressed, but specific instructions to wipe plates on the operator's shirt sleeve and handle plates *only by their edges* are omitted.

"References have been made to original sources, and chapter bibliographies have been given of some of the more useful and accessible works on each subject." Many more of these would be welcome. In the "History of Spectroscopy" (p. 16), the growing interest in chemical analysis by emission spectra is

illustrated by tabulating the annual output of papers listed in the "Index to the Literature on Spectrochemical Analysis, 1920-1937." This presentation would have been more effective if the 2nd edition of this Index (1941) had been quoted instead of the first. This index is not referred to in Chapter 13 on "Spectrochemical Analysis."

Preliminary interferometric measurements on iron lines in the regions 7164A to 10216A are mentioned on p. 207, but no reference is given. On p. 210 computed values of the refractivity of dry air are quoted without credit (Trans. Int. Astr. Union 6, 87; 1938) or references, and the false impression is given that four laboratories have observed the dispersion of air for wavelengths from 2000A to 10000A.

In the opinion of this reviewer any defects or deficiencies that this first edition of "Experimental Spectroscopy" may exhibit are largely compensated by such sage counsel as the following: on page 101, "It is always well to be suspicious of test plates submitted for a spectrograph if they have been made by light exposures on extremely high-contrast plates," and on page 298, "It must be borne in mind that the absence of the detection lines of an element indicates merely that the element is not present in sufficient amount to be detected with the source and equipment used."

As a guide for the intelligent selection of spectrographic apparatus and for its best use in research and testing this book has no equal.

*Infrared Spectroscopy. Industrial Applications and Bibliography.* By R. BOWLING BARNES, ROBERT C. GORE, URNER LIDDEL and VAN ZANDT WILLIAMS. v + 236 pp. 11 figs.  $15\frac{1}{2} \times 23\frac{1}{2}$  cm. New York: Reinhold Publishing Corporation. 1944. \$2.25.

In a brief preface the authors state that "This work is presented as a partial answer to the increasing demand for information concerning the industrial applications of infrared spectroscopy. It is not claimed that this material represents a complete survey of the field or its literature or the ultimate in infrared techniques. Rather, the applications and the results discussed are based entirely on work done in this laboratory in order that a unified picture of a typical infrared research program could be available to those who may be interested." Successive sections and pages deal with "Infrared Spectroscopy," 1-42, "Library of Reference Curves," 43-113, "Bibliography," 114-236. All this material, except the bibliography, was published previously by three of the authors in *Industrial and Engineering Chemistry (Analytical Edition)*, 15: 659-709, 1943.

Figure 1, Graph of the Electromagnetic Spectrum, was correctly printed the first time, but in the second

printing one decimal point was misplaced. Both printings show 350,000 Å (350  $\mu$ ), and  $1\text{ cm}^{-1} = 1/\lambda_{(\text{cm})}$ . Obviously the first is in error by a factor of 10, and the second is true only when  $\lambda = 1\text{ cm}$ . These errors are much too trivial to damage the book; they are cited only as warnings to proofreaders.

The theory of infrared absorption and its relation to molecular structure are discussed to provide the background essential for detailed descriptions of techniques useful in analysis. A description of a spectrometer is followed by transmission curves for 363 organic compounds including hydrocarbons, alcohols, ethers, carbonyl compounds, nitrogen compounds, terpenes, organic chlorides and miscellaneous. These curves represent absorption spectra between 2,000 and 750  $\text{cm}^{-1}$ ; they may be used for studying correlations between molecular structure and spectral characteristics, for identification of unknown materials,

and for determining in advance the possibilities of qualitative and quantitative infrared analysis of mixtures.

The bibliography, presumably contributed largely by the second-named author, probably represents the chief justification for the printing of this book. It contains 2,701 entries, and even though it is incomplete it is incomparable because it is the first large collection of titles associated with infrared, so far as this reviewer knows.

In the relatively new field of industrial applications of infrared spectroscopy this book will have a triple appeal, first as an outstanding example of success in a certain industry, second as a valuable catalogue of the absorption spectra of organic compounds, and third, as a source of published information of general and specific interest.

WILLIAM F. MEGGERS

## SPECIAL ARTICLES

### EXPERIMENTAL AND CLINICAL OBSERVATIONS ON INCREASED MECHANICAL FRAGILITY OF ERYTHROCYTES<sup>1,2</sup>

#### INTRODUCTION

SINCE the work of Meltzer and Welch<sup>3</sup> and of Rous and Turner<sup>4</sup> the liability of red blood cells to physical destruction by the motion of the circulation has received little attention. Recently, however, Dameshek and Miller,<sup>5</sup> Stats<sup>6</sup> and Tsai and associates<sup>7,8</sup> have observed increased mechanical fragility of agglutinated red blood cells. Shen, Ham and Fleming<sup>9</sup> noted the increased mechanical fragility of the red blood cells of previously heated blood. The present report is a preliminary account of a quantitative method for determining the mechanical fragility of erythrocytes, of some experimental factors affecting this property and of its relation to certain hemolytic anemias.

<sup>1</sup> From the Thorndike Memorial Laboratory, Second and Fourth Medical Services (Harvard), Boston City Hospital, and the Department of Medicine, Harvard Medical School, Boston, Mass.

<sup>2</sup> This investigation was aided by a grant from the John and Mary R. Markle Foundation.

<sup>3</sup> S. J. Meltzer and W. H. Welch, *Jour. Physiol.*, 5: 255-260, 1884.

<sup>4</sup> P. Rous and J. R. Turner, *Jour. Exp. Med.*, 23: 219-237, 1916.

<sup>5</sup> W. Dameshek and E. B. Miller, *Arch. Int. Med.*, 72: 1-17, 1943.

<sup>6</sup> D. Stats, *Proc. Soc. Exp. Biol. and Med.*, 54: 305-306, 1943.

<sup>7</sup> J. S. Lee, Y. C. Puh and C. Tsai, *Proc. Chinese Physiol. Soc., Chengtu Branch*, 2: 59-61, 1944.

#### METHOD

The percentage volumes of red blood cells (hematocrits) of samples of defibrinated blood to be compared (including a normal control) were adjusted to approximately 40 per cent., if necessary, by removal or addition of serum. Seven cubic centimeters of each sample of blood to be tested were introduced into individual cylindrical 150 cc soft glass tonometers (permitting equilibration of the blood with gas mixtures), the length of the parallel portions of the sides of which was about 130 mm, the diameter about 28 mm. To each tonometer were added 50 glass beads uniformly 4 mm in diameter. The tonometers were then attached at each end to clips on the periphery of two wheels approximately 150 mm in diameter. These wheels were fixed at an appropriate distance apart on a horizontal axle which was rotated at 28 to 30 r. p. m., usually for 2 hours at room temperature.<sup>10</sup> Before rotation, an accurately measured 0.1 cc sample of blood (designated as sample C) was introduced into a test tube containing 1 cc of distilled water (complete osmotic lysis). At the start and at the termination of the period of rotation, additional 0.1 cc samples of the blood (samples A and B) were delivered into test tubes containing 1 cc of a 1.25 per cent. solution of

<sup>8</sup> Y. C. Puh, J. S. Lee and C. Tsai, *Proc. Chinese Physiol. Soc., Chengtu Branch*, 2: 61-63, 1944.

<sup>9</sup> S. C. Shen, T. H. Ham and E. M. Fleming, *New Eng. Jour. Med.*, 229: 701-713, 1943.

<sup>10</sup> Recently, 50 cc rubber stoppered Erlenmeyer flasks, each containing 10 beads and 0.5 cc of oxalated blood, were found satisfactory when attached so that the beads rolled in the greatest internal circumference of the flasks.

sodium chloride (no osmotic lysis). After centrifugalization, the amounts of hemoglobin in the supernatants in these 3 test tubes were determined, as is usual, in the Evelyn colorimeter and were designated as *c*, *a* and *b*, respectively.

The mechanical fragility (M. F.) of a sample was determined by means of the formula,  $M. F. = \frac{b-a}{c-a}$ , and expressed as a percentage value. In most instances no significant amount of cell fragmentation without release of hemoglobin resulted from the trauma, as was indicated by the absence of hemoglobin-containing cell fragments in the sediments of the traumatized samples, as well as by the unaltered osmotic resistance of the cells remaining intact. Accordingly, the percentage of hemoglobin liberated was considered to be equivalent to the percentage of cells destroyed by the trauma.

#### RESULTS

**Technical Factors.** When a sample of normal human blood was divided into 6 parts, their respective M. F. values were 2.8, 3.0, 2.9, 3.2, 2.9 and 2.8 per cent. Simultaneous determination of the M. F. of samples of defibrinated blood from each of 6 normal subjects gave the following values: 3.0, 3.4, 3.2, 3.4, 3.2 and 2.6 per cent.

The percentage volume of red blood cells had a decided effect on the proportion of hemoglobin liberated by trauma. Thus, for portions of a sample of normal human defibrinated blood with hematocrits adjusted to 9.6, 28.6, 50.0, 68.8 and 90.4 per cent., the M. F. values were, respectively, 1.6, 2.1, 3.8, 6.8 and 14.3 per cent. It was recognized that even with identical hematocrits, differences in the mean corpuscular volume of erythrocytes might affect slightly the comparative M. F. values. However, because the M. F. was expressed in terms of percentage of hemoglobin liberated, rather than in absolute values, differences in the mean corpuscular hemoglobin concentration of two samples could not distort the evidence as to the percentages of cells destroyed.

**Spheroidicity.** From the fact that the spherical form of the erythrocyte is "critical" for rupture of the cell membrane by osmotic forces it was anticipated that if normal erythrocytes were rendered relatively spheroidal by immersion in hypotonic solutions, their mechanical fragility would increase sharply as the final spherical form was approached. This was found to be the case for washed cells suspended either in progressively hypotonic solutions of sodium chloride or in serum progressively diluted with water. At tonicities equivalent to 0.85, 0.62 and 0.44 per cent. sodium chloride solution, the M. F. values of erythrocytes were as follows: in sodium chloride

solutions, 6.5, 10.1 and 23.9 per cent.; in serum, 2.3, 6.4 and 15.0 per cent., respectively. In order to compensate for the differences in the amount of swelling of the red blood cells caused by the various hypotonic media, the proportion of cells in each sample was finally adjusted to approximately 40 per cent.

**Cohesion.** In theory, increased cohesion between red blood cells should increase their liability to rupture by mechanical trauma. When 43 per cent. by volume of washed human erythrocytes were suspended in complement-inactivated serums with various titers of iso-agglutinins, the M. F. of the samples remained between 3.1 and 3.7 per cent. for titers from 0 to 1:250. However, at titers of 1:512 and 1:1024, the M. F. values were 5.4 per cent. and 13.2 per cent., respectively. The M. F. values of a blood sample with a hematocrit of 42 per cent. and a serum titer of cold agglutinins of 1:640 were found at temperatures of 37°, 24° and 15°-20° C. to be 0.8, 3.6 and 23.6 per cent., respectively. Control M. F. values for a normal blood were 1.8, 1.8 and 4.0 per cent., respectively. When one portion of a sample of the blood of a patient with sickle cell disease and a hematocrit of 44 per cent. was fully oxygenated, the M. F. was 4.6 per cent. The other portion of the sample was kept in a nitrogen atmosphere (erythrocytes sickled) during rotation in the tonometer, and showed an M. F. of 18 per cent.

The increased cohesion of the red blood cells was reflected by the increased "viscosity" of the blood sample as measured in the Ostwald instrument. By contrast, in experiments with bloods in which the viscosity of the serum was greatly increased by the addition of gelatin, the mechanical fragility of the erythrocytes was not increased; nor, despite rouleaux formation, was the mechanical fragility detectably augmented by the increased serum viscosity in a case of multiple myeloma.

**Membrane.** Finally, changes in the strength of the membrane of the red blood cell were found to affect the mechanical fragility. Thus, as already observed by Rous and Turner,<sup>4</sup> when 45 per cent. by volume of erythrocytes from defibrinated human blood were suspended in isotonic salt solution their M. F. increased to 5 per cent., but when the cells were resuspended in serum, it returned at once to its initial value of 2.1 per cent. Again, human erythrocytes, 36.2 per cent. by volume, were incubated under sterile conditions in a medium (isotonic) containing 5.4 grams of sucrose and 0.425 grams of sodium chloride per 100 cc. After 42 hours, although the osmotic fragility of all the erythrocytes in the sample had decreased to below normal, their M. F. had increased from 4.8 to 31 per cent.

**Clinical Applications.** So long as the blood moves,



there is kinetic energy potentially available for mechanically destroying red blood cells. The increased mechanical fragility of red blood cells which have been rendered nearly spherical suggests a teleological reason for the biconcavity of mammalian erythrocytes; namely, the inevitability of rupture, were a nearly spherical cell to be deformed in traversing a narrow capillary. The increase in mechanical fragility with increase in hematocrit may be a factor in limiting the concentration of red blood cells normally in circulation.

The correlation between increased osmotic fragility (spheroidicity) and increased mechanical fragility, already observed under experimental conditions, was found to occur in congenital hemolytic jaundice. In one case in which the osmotic fragility of the erythrocytes was characteristically increased, their mechanical fragility was also augmented, so that with a hematocrit of only 30.2 per cent. the M. F. was 12.8 per cent. At splenectomy, the osmotic fragility of the blood in the spleen was found to exceed that of the peripheral blood. After splenectomy, as the evidence of increased blood destruction diminished, the osmotic and mechanical fragilities of the red blood cells declined progressively, until 39 days after the operation both were approximately normal.

In patients with thermal burns and hemoglobinuria, the erythrocytes have been found to be relatively spheroidal and to be increased in osmotic fragility.<sup>9</sup> In addition, such erythrocytes exhibit increased mechanical fragility, as do those of samples of human blood momentarily heated *in vitro* to from 52° to 58° C. Similarly, the erythrocytes of heated dog's blood are osmotically and mechanically fragile and are rapidly destroyed on re-injection into the animal.<sup>9</sup>

In the absence of increased osmotic fragility and cohesion between erythrocytes, increases in mechanical fragility are presumably on the basis of diminished strength of the cell membrane. This was found to be the situation with respect to patients with pernicious anemia tested prior to treatment with liver extract. Thus, in 3 such cases, osmotic fragility values were normal, but the M. F. values were 3.7, 3.9 and 4.3 per cent. The M.F. of the erythrocytes of a patient in advanced remission induced by liver extract was 2.1 per cent.; that of a normal control was 2.0 per cent. In these experiments the hematocrits were all adjusted to approximately 25 per cent.

In agreement with others,<sup>5,6,7,8</sup> it is suggested that the cohesion of erythrocytes may lead to their prompt mechanical destruction while in motion in the circulation. *In vitro*, increased mechanical destruction was shown to occur in the presence of iso-agglutinins and cold agglutinins, and in experiments with sickled

erythrocytes. It has already been suggested<sup>11</sup> that such types of erythrocyte cohesion may cause sequestration of erythrocytes in the spleen and other tissues, with consequent progressive increase in their spheroidicity and osmotic fragility. Incubation of erythrocytes, at least *in vitro*, increases both their osmotic and mechanical fragilities. Consequently, if certain red blood cells temporarily sequestered (incubated) in the spleen, escape before their osmotic destruction occurs, they may still be readily destroyed when re-subjected to the traumatic motion of the circulation, because of their increased mechanical fragility.

SHU CHU SHEN  
W. B. CASTLE  
ELEANOR M. FLEMING

#### PROGRESSIVE ASCENDING PARALYSIS IN DOGS DUE TO DEFICIENCY OF A VITAMIN B COMPLEX FACTOR FOUND IN YEAST<sup>1</sup>

THE thirty-eight dogs used in this study received a synthetic B complex free diet composed of casein (water and alcohol extracted) 40 per cent., sucrose 36, cotton seed oil 18, cod liver oil 2, mineral salts 4 per cent. This was altered in the case of the positive control animals to contain dried brewers' yeast at a level of 10 per cent. as a source of the B complex. The others had their B complex requirement met by seven or eight of the following synthetic vitamins: (1) thiamine hydrochloride; (2) riboflavin; (3) pyridoxine; (4) nicotinic acid; (5) pantothenic acid; (6) para-aminobenzoic acid; (7) inositol, and (8) choline.<sup>2</sup>

The incidence of paralysis varied considerably on the different deficiencies, but it was greatest in the animals receiving all the synthetic B complex factors listed above where eleven out of twelve animals became paralyzed.

The paralysis comes on gradually, the early signs being a peculiar gait and an arching of the neck; then the hind legs show marked spasticity. There are often several bouts of transient paralysis with spontaneous recovery before the final progressive stage is reached. It is then rapidly progressive and ascending, the hind legs becoming involved first, then the fore legs, then the neck and, finally, the respiratory center. The paralysis is at first spastic and later becomes almost completely flaccid. It is rapidly fatal if untreated.

<sup>11</sup> T. H. Ham and W. B. Castle, *Tr. Asn. Am. Phys.*, 55: 127-132, 1940.

<sup>1</sup> Reported at the meeting of the American Chemical Society, September 12, 1944, New York City.

<sup>2</sup> *SCIENCE*, 98: 520, 1943. The amounts of inositol and choline were subsequently increased to 300 mg per dog per day.

Paralysis is regularly prevented by brewers' yeast, is cured by a water extract of yeast,<sup>3</sup> and has responded promptly (8-12 hours) to synthetic biotin<sup>4</sup> therapy in seven attacks in four dogs. The biotin was dissolved in physiological saline and administered subcutaneously. The therapeutic dose is approximately 100 gamma per kilo.

SUSAN GOWER SMITH

DUKE UNIVERSITY SCHOOL OF MEDICINE

### PRELIMINARY NOTE ON THE INACTIVATION OF ANTIBIOTICS

DURING the course of investigations on antibiotic substances of plant origin<sup>1</sup> an antibiotic active against both Gram positive and negative organisms was isolated from *Allium sativum*. During the course of chemical studies of this antibiotic, the reaction with cysteine was investigated. It was found, as is the case with penicillin, that the antibiotic is rapidly inactivated by cysteine.

A number of other antibiotics of thallophyte and spermatophyte origin available in this laboratory were tested in the presence of cysteine. In every case, cysteine gave complete inactivation or marked diminution of antibiotic activity. Gram-positive antibiotic activity is more susceptible to cysteine inactivation than the Gram-negative activity.

The following antibiotics were inactivated: penicillin, citrinin, gliotoxin, clavacin (patulin or clavi-formin), pyocyanine; the active principles of *Allium sativum*, *Ranunculus acris* and *R. bulbosus*, *Erythronium americanum*, *Asarum reflexum*, *Bassia* species and *Arctium minus*. The antibiotic principles of *Allium sativum*, *Erythronium americanum*, *Asarum reflexum* and *Arctium minus* will be described in greater detail later.

The testing procedure was as follows: Water solutions of each of the antibiotics were divided into two portions. One portion was used as a control and to the other was added solid sodium bicarbonate ade-

quate to maintain a pH of approximately 7 and cysteine hydrochloride. The solutions were allowed to stand for 30 to 60 minutes, then tested for antibiotic activity against *Staphylococcus aureus* and *Bacillus paratyphosus* A by the Oxford cup method.

This antagonistic effect of cysteine was similarly displayed by cysteine esters (methyl and ethyl), but not by S-methyl cysteine, methionine, alanine or serine. Other -SH compounds such as glutathione and thioglycolic acid had either no effect or a much weaker action.

This inactivation is especially unusual in the light of the widely different chemical types of antibiotics involved. The nature of the reaction of cysteine with some of the antibiotics is known; others are being investigated. In the known instances, cysteine reacts irreversibly with the antibiotics. However, this may not be true of all the antibiotics. Quantitative relationships of the antagonistic activity of cysteine and related compounds are being studied and will be reported later. It is suggested that possibly the fundamental mode of action of certain classes of antibiotics involves their ability to interfere with the normal function of sulfhydryl groups in bacterial metabolism. This has already been observed in some specific instances as by Fildes,<sup>2</sup> in his investigation of the mode of action of mercury as an antibacterial agent; by Eagle,<sup>3</sup> who observed that the anti-spirochetal action of arsphenamine could be counteracted by cysteine; and by Atkinson<sup>4</sup> in her work with penicillin.

That the sulfhydryl group is essential to cell proliferation has been demonstrated and discussed by Hammett.<sup>5,6</sup>

This note is published with the desire that other investigators having access to different antibiotics will test such substances for inactivation by cysteine.

C. J. CAVALLITO

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## SCIENTIFIC APPARATUS AND LABORATORY METHODS

### ENHANCED PRODUCTION OF PENICILLIN IN FLUID MEDIUM CONTAINING CELLOPHANE<sup>1,2</sup>

THE observation was made that young colonies of

*Penicillium notatum* in fluid medium show a tendency to develop nearer the side walls of the vessel than

<sup>3</sup> Kindly supplied by Dr. C. N. Frey, of the Fleischmann Laboratories, Standard Brands, Inc., New York, N. Y.

<sup>4</sup> Kindly supplied by Dr. D. F. Robertson, of the Merek Company, Inc., Rahway, N. J.

<sup>1</sup> This work was begun before the appearance of the article by Osborn, *Brit. Jour. Exper. Path.*, 24: 227, 1943, and as a result, many of the plants tested have been duplicated.

<sup>1</sup> From the Laboratories of Bacteriology, The Mount Sinai Hospital, New York, N. Y.

<sup>2</sup> The author wishes to acknowledge thankfully the accurate and capable assistance of Miss Alice Fisher.

<sup>2</sup> Fildes, *Brit. Jour. Exper. Path.*, 21: 67, 1940.

<sup>3</sup> Eagle, *Brit. Pharmacol.*, 66: 436, 1939.

<sup>4</sup> Atkinson, Stanley, *Australian Jour. Exper. Biol. Med. Sci.*, (4)21: 249, 255, 1943.

<sup>5</sup> Hammett, Hammett, *Protoplasma*, 15: 59, 1932.

<sup>6</sup> Hammett, Chapman, *Growth*, 2: 223, 297, 1938.

towards the center of the surface of the fluid. The purpose of this investigation was to determine whether the introduction of some supporting material into the fluid medium could enhance the growth of the *Penicillium* and thereby increase the production of penicillin. In order to avoid a possible loss of penicillin on the solid surface, Cellophane No. 600 permitting rapid diffusion of the substance was selected for the work.<sup>3</sup> Cellophane in the form of an open bowl was inserted into "500 cc" Erlenmeyer flasks and filled with the fluid medium. The diameter, height and number of side folds of the bowls were varied in order to obtain different ratios of the surface of Cellophane to the total volume of the medium. The medium manufactured by Eimer and Amend for cultivation of *Penicillium notatum* was employed. The strains of the mold were maintained by serial transplants on agar medium. The titers of penicillin recorded indicate the highest dilution of the test material giving complete inhibition of growth of a standard suspension of stain H of *Staphylococcus aureus*.<sup>4,5</sup>

In the first group of experiments the submerged penicillin producer, strain NRRL 832 was used for inoculation. In the flask with Cellophane, on the 3rd day following inoculation there appeared numerous isolated colonies on the side folds and upper borders of the bowl. On the 6th day solid sheets of the mold showing yellow green pigment covered the upper third of the bag extending over the entire surface of the fluid. In the control flask containing the same amount of medium, growth was poor for a period of 5 to 6 days due to the unfavorable  $\frac{\text{surface area}}{\text{total volume}}$  ratio (i.e., 0.0775).<sup>6</sup> Although on the 9th day a solid pellicle formed, the growth remained considerably scantier than in the experimental flask for an additional period of 8 days. As may be seen from Fig. 1, the production of penicillin began in the flask with Cellophane on the 5th day following inoculation, namely, 3 days earlier than in the control. On the 8th day, when penicillin made its appearance in the

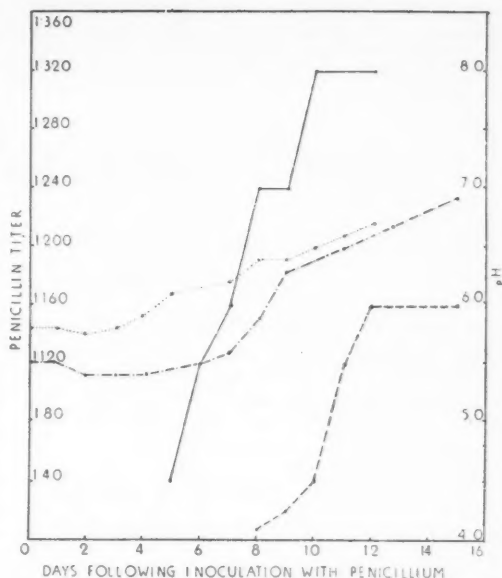


FIG. 1. Inoculum: suspension of spores in  $H_2O$  from a 4-day-old culture of strain NRRL 832, submerged penicillin producer. —: daily determinations of penicillin in fluid culture containing Cellophane. Medium: 400 cc surface area total volume ratio 0.0775. — — —: daily determinations in a fluid culture without Cellophane. Medium: 400 cc surface area total volume ratio approximately the same, as above (the amount of Cellophane used above produces negligible displacement). . . . .: daily pH changes in Cellophane containing culture. — . —: daily pH changes in culture without Cellophane.

control, the concentration of the drug in the experimental flask was already 30 times greater. During the following days the concentration rapidly increased in the control, remaining, however, markedly lower than in the flask with Cellophane.

The remaining studies were carried out in order to determine the advantages of this method under conditions unfavorable for production of penicillin.

In the following experiment the submerged penicillin producer was used again. The inoculum was obtained, however, from a nine-day-old agar culture showing a white cottony growth. A culture incubated longer than 3 to 4 days and of the above appearance may be a weak penicillin producer.<sup>6</sup> As may be seen from Fig. 2, in the flask without Cellophane, penicillin 1:10 appeared on the 9th day and disappeared altogether on the 11th day following inoculation. In contrast, in the Cellophane containing flask penicillin appeared on the 6th day and reached the titer 1:80

<sup>3</sup> Cellophane was previously shown to be capable of increasing production of toxic substances of certain microorganisms, i.e., *Staphylococcus* (L. Birch-Hirschfeld, *Z. Immunitätsforsch.*, 81: 260, 1933-34; Douglas McLean, *Jour. Path. and Bact.*, 44: 47, 1937), *E. typhosa*, *E. coli* and meningococcus, S. A. Morrell and Gregory Schwartzman, *Jour. Exp. Med.*, 67: 13, 1938.

<sup>4</sup> The author is thankful to Dr. Robert D. Coghill, of the U. S. Department of Agriculture, for supplying strains NRRL 832 and NRRL 1249.B21, and to Dr. Jackson W. Foster, of the Merck Research Laboratories, for the strain H of *Staphylococcus aureus*.

<sup>5</sup> C. M. McKee, G. Rake and A. E. O. Menzel, *Jour. Immun., Virus Res., and Exp. Chemoth.*, 48: 259, 1944.

<sup>6</sup> I. W. Foster, H. B. Woodruff and L. E. McDaniel, *Jour. Bact.*, 46: 421, 1943.

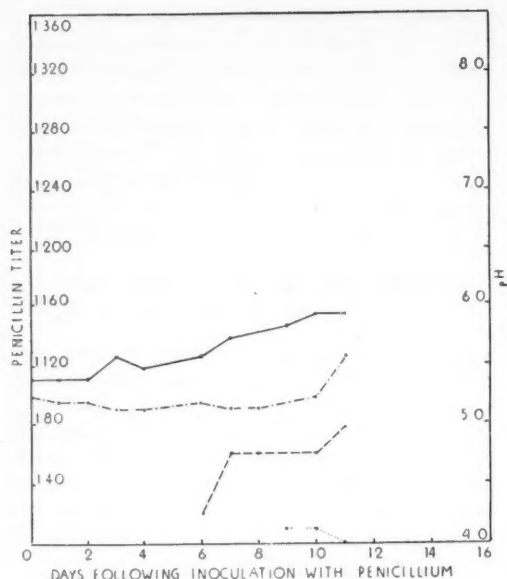


Fig. 2. Inoculum: suspension of spores in  $H_2O$  from a 9-day-old agar culture with white cottony growth of strain NRRL 832, submerged penicillin producer. —: daily determinations of penicillin in a fluid culture containing Cellophane. Medium: 400 cc  $\frac{\text{surface area}}{\text{total volume}}$  ratio 0.0775. ....: daily determinations of penicillin in a fluid culture without Cellophane. Amount of medium: the same;  $\frac{\text{surface area}}{\text{total volume}}$  ratio: approximately the same as above. — — —: daily pH changes in the Cellophane containing culture. — . —: daily pH changes in culture without Cellophane.

on the 11th day. It may be also noted that the control flask yielded on the 6th day a moderate growth which became fairly abundant during the following 2 days. The experimental flask showed numerous colonies on the 3rd day and a heavy growth on the 5th day.

In the experiment described below strain NRRL 1249.B21, the surface penicillin producer was used. The flasks each contained 475 cc of the medium. The  $\frac{\text{surface area}}{\text{total volume}}$  ratio of 0.0315 was extremely unfavorable for production of penicillin. Observations were made for 19 days. In the flask without Cellophane the highest penicillin titer obtained was 1:10. In the flask with Cellophane penicillin appeared on the 12th day. The highest titer 1:120 was reached on the 15th day, remaining approximately the same for the following 4 days. The growth was decidedly better in the experimental than in the control flask.

The changes in the H-ion concentration within the

first 15 days of cultivation are given in Figs. 1 and 2. During this period cultures with Cellophane maintained consistently a somewhat higher pH level than the controls. A more significant effect of the Cellophane upon the pH was observed at later stages of growth not recorded in the figures. Thus, in control flasks having the favorable  $\frac{\text{surface area}}{\text{total volume}}$  ratio 0.313 the pH usually rose sharply from 6.6–6.8 on the 14th day to 7.8–8.2 on the 19th day. Consistently during the same period the pH did not exceed 6.8 in the flasks with Cellophane.

#### SUMMARY

Enhanced production of penicillin is made possible by addition of Cellophane to fluid media. With Cellophane bags of suitable surface, the growth of the submerged and surface penicillin producing strains of *Penicillium notatum* is significantly faster and more abundant; penicillin makes its appearance earlier and reaches higher concentration in larger total volumes than in control cultures without Cellophane.<sup>7</sup> Thus the gain with the method described is both in the rate of production as well as in the total yield of penicillin. The enhancement also occurs under conditions unfavorable for development of penicillin, namely, (a) with degenerated cultures of the mold; and (b) when the surface penicillin producing strain is grown in cultures with an unfavorably small  $\frac{\text{surface area}}{\text{total volume}}$  ratio (0.0315). There is also noted a markedly stabilizing effect of Cellophane upon the H-ion concentration of abundantly growing cultures during active production of penicillin. The stabilization is of significance, since the sharp rise in pH usually occurring in *Penicillium* cultures tends to destroy rapidly the penicillin.

GREGORY SHWARTZMAN

<sup>7</sup> In subsequent experiments in which large numbers of Cellophane strips instead of the bags were used, there was obtained markedly greater and faster production of penicillin than described in this report.

#### BOOKS RECEIVED

- Annual Report of the Board of Regents of the Smithsonian Institution Showing the Operations, Expenditures, and Condition of the Institution for the Year Ended June 30, 1943.* Illustrated. Pp. xi + 609. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. \$2.00. 1943.
- HERTZLER, ARTHUR E. *Ventures in Science of a Country Surgeon.* Illustrated. Pp. xi + 304. Halstead, Kansas: Arthur E. Hertzler. 1944.
- SWANK, EDITH ELLIOTT. *The Story of Food Preservation.* Illustrated. Pp. 97. H. J. Heinz Company. 1944.
- TIMM, JOHN ARREND. *General Chemistry.* Illustrated. Pp. xii + 692. McGraw-Hill Book Company. \$3.75. 1944.



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## SCIENCE NEWS

*Science Service, Washington, D. C.*

## A NEW UNDERWATER CAMERA

A NEW underwater camera that will help science to uncover the secrets of the ocean's floor was described by Professor Maurice Ewing, of Columbia University, a member of the Woods Hole Oceanographic Institution, at a meeting of the Optical Society of America held in New York City.

The camera is its own photographer. A special trigger hangs down from the bottom of the camera. When the tip of the trigger touches the ocean floor, it sets off the flashlights and clicks the shutter. The tip of the trigger may be extended to any practical length, and the lens adjusted so that the picture taken will be in focus.

The main advantage of the new camera, Dr. Ewing stated, is that it can be lowered into a submarine world, 100 fathoms or more down, and take its pictures with less disturbance to animal life, and at a lower cost, than by other means.

Two types of camera have been developed. One has a ballast and a float. The complete unit is tossed over the side of a ship. The ballast carries it to the bottom. When it gets there, a trigger starts clockwork for taking a series of pictures at any pre-set time interval. When the last picture has been made, the camera releases the ballast, and the float carries it back to the surface. A compass and a drift indicator may be suspended in the field of view of the camera to show changes that occur in the direction of the current while the series of pictures is being made. The other type of camera is lowered on a wire, and makes just one picture.

There are many ways in which scientists may be expected to use the new camera. Already it has been used to study the habits of deep-sea life in an undisturbed state. In very deep water it has proved valuable for taking a census of the animal population. The camera is better than a collecting net for this purpose, since many fish escape the net, or are so fragile that they are destroyed by the net before reaching the surface.

Geologists use the camera to study the ocean floor. The camera showed sand ripples at 97 fathoms, proving that there is enough current at this depth to move sand around. A series of pictures showed that the direction of the ripples changes with tides, proving constant movement. The camera is expected to help to uncover many interesting facts about the submarine canyons off the Pacific coast of the United States.

The first underwater photographs were made fifty-four years ago in 1890 by a Frenchman named Boutan. The camera he used consisted of a sealed unit for the camera, and a shutter control that extended to the surface. The camera was lowered into shallow water, and the shutter was clicked by means of pulling on the shutter cable. For the next forty years divers took their cameras down with them, encased in rubber jackets. Dr. William Beebe took pictures through the thick widow in his bathysphere. Dr. Williamson took pictures from the window of a gondola dropped beneath the surface, with a flexible tube large

enough to permit a man to pass through it, extending from the surface to the gondola.

The new camera returns to the principle of the Boutan camera.

## ITEMS

YOUNG psychologists serving in the Army as enlisted men are now offered an opportunity to obtain commissions as second lieutenants, upon applications made through their immediate commanding officers. Those considered best qualified will be put directly to work at tasks for which their professional training and experience qualify them, ranging from psychological testing and counselling to teaching in colleges and care of mentally and physically handicapped cases. Minimum education requirements are a bachelor's degree in psychology, sociology or educational or industrial psychology.

CROWN gall, a disfiguring and destructive disease of plants that is often called plant cancer, has been cured with penicillin in the plant pathology laboratories of the University of Arizona by Professor J. G. Brown, head of the department. Crown gall is caused by a bacterial species, differing in this respect from human and animal cancers which it resembles in many other ways. So far as known, human and animal cancers are never directly produced by bacterial attack. Regardless of whether or not Professor Brown's discovery proves to have significance in the fight on human cancer, it promises practical results in the immediate field of plant pathology if it leads to a practical treatment of crown gall in the field. This disease is known to attack at least a hundred kinds of plants, and is an especially destructive enemy of young shrubs and trees in nurseries and orchards. The crude penicillin extract used in the experiments successfully cured the soft type of crown gall. It cost two cents per quart, and a quart is sufficient to destroy many small galls.

THREE-DIMENSIONAL pictures of views through an electron microscope revealing the shape of ultra-microscopic crystals, of which magnesium and other metals are composed, were demonstrated publicly for the first time at the twenty-ninth annual meeting of the Optical Society of America. The point of a common pin can be made to appear as vast and rough as a mountain range when photographed through an electron microscope, and enlarged to 100,000 diameters on a three-dimensional Polaroid vectograph. In these three-dimensional pictures, it is now possible to study and measure the shape and space characteristics of minute structures that are extremely difficult to see in ordinary photographs. The demonstration of techniques in applied electron microscopy was made by Robert D. Heidenreich, of the Dow Chemical Company, Midland, Mich., where the electron microscope has been used in the investigation of corrosion phenomena in magnesium alloys.



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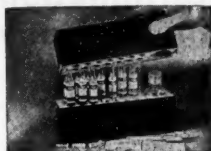
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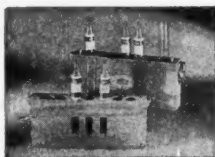
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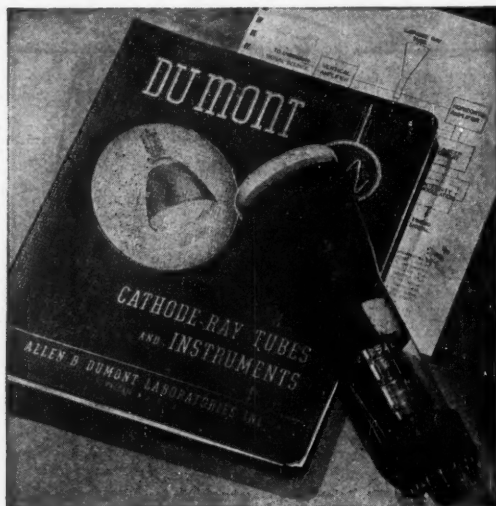
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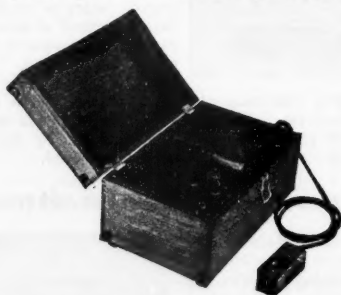
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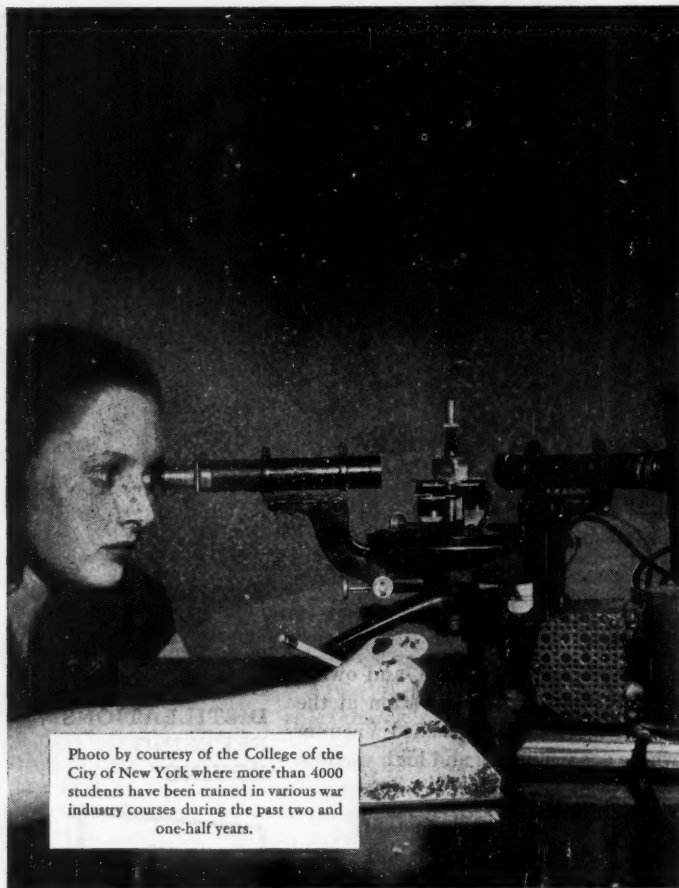


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